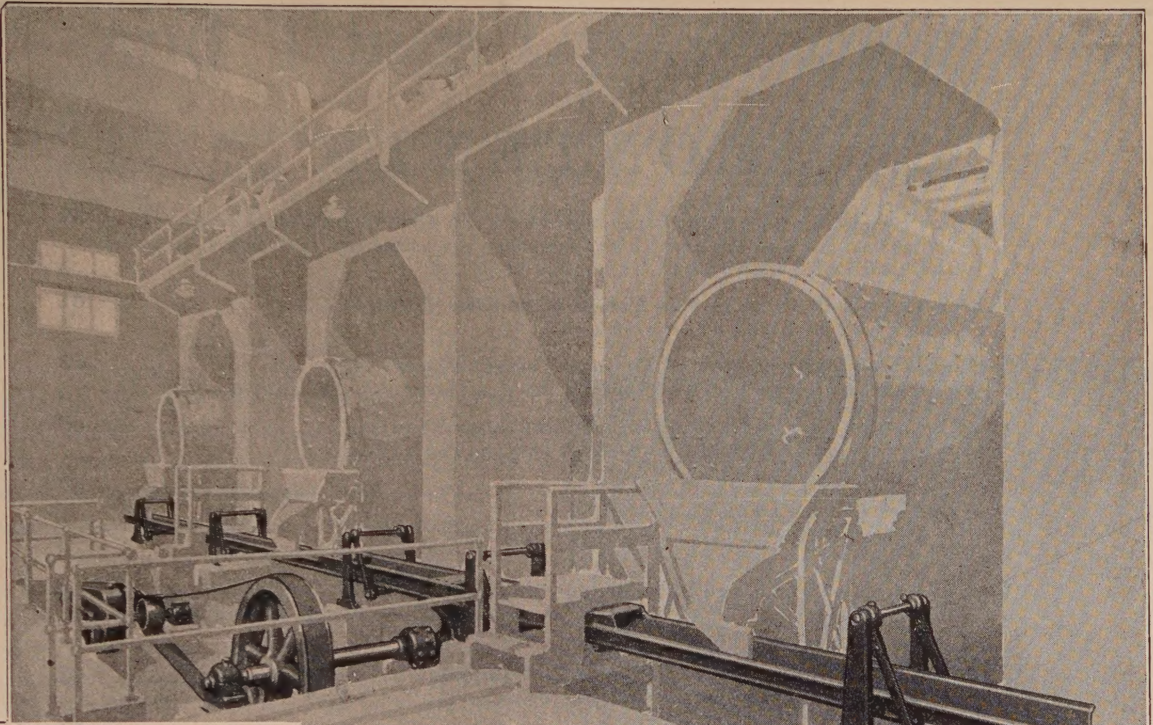
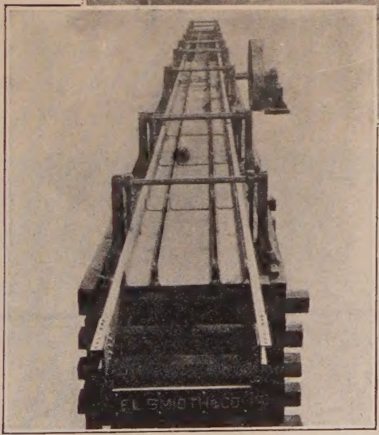
CEMENT MILL SECTION of
Concrete

THE SKIPULTER

(Trade Mark Reg.)



A Skipulter installed in a western cement plant, where it is conveying cement clinker, discharged from three coolers, to an elevator



Triplex Skipulter for conveying three different materials between the same or different stations

FLS

THE Skipulter is an improved type of shaker conveyor for transporting coarse materials, such as cement clinker, coal, ore, slag, rock, limestone, etc.

It consists of a steel trough, suspended by pendulums, actuated through a flywheel and eccentric into an intermittent forward and backward motion. No springs or rollers are employed. The transported material is rapidly and constantly carried forward to point of discharge.

The Skipulter can be arranged to receive different materials at different feed points at the same time, either mixing them or keeping them separated during the transport as desired. And, the discharge can be arranged at either end of the trough or at various intermediate stations as required.

This type of conveyor is one of the simplest means of conveying materials, economical to operate, requiring very little horsepower, and is a simple solution to many conveying problems.

F. L. SMIDTH & COMPANY
Engineers
225 Broadway New York, N. Y.

CEMENT MILL SECTION of Concrete

The Cement Mill Edition of Concrete is edited exclusively for those interested in the manufacture of portland cement. Its pages are devoted to discussions of plant design, management, operation, production efficiency, chemical research and control, quarry operation, progress and news of the industry.

The Cement Mill Edition also contains all the material published in the corresponding Regular Edition and so provides news of the uses and merchandising of the materials whose manufacture is discussed in the Mill Edition. The Regular Section furnishes mill operating officials and mill executives valuable points of contact with the users of the materials they produce.

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CEMENT MILL SECTION of

Concrete

Vol. 39 Chicago, August, 1931 No. 2

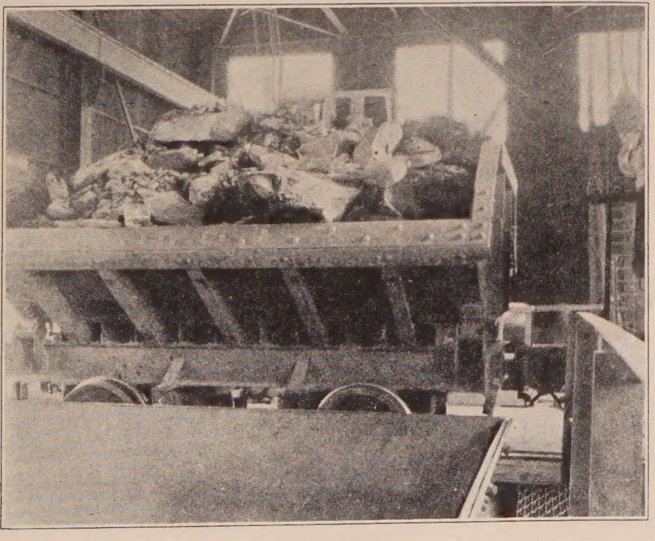
Keystone Builds New Crushing Plant and Tunes Up Grinding

Primary and Secondary Crushers Handle 400 Tons Per Hour — Dust Collecting System Installed — Cement Storage Capacity Increased to 480,000 Barrels

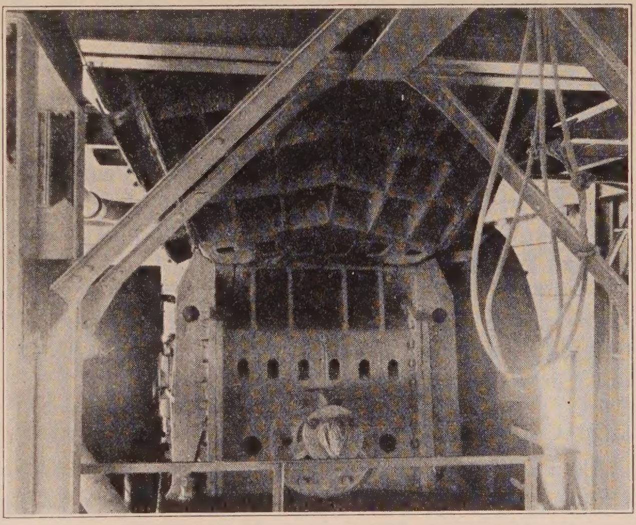
By R. P. BROWN
Lakewood, Ohio

BUSINESS comes to those who go out after it, and 1930 found the Keystone Portland Cement Company actively on the job. In fact, to keep production up and costs down they had to rebuild their crushing plant, making it one of the most efficient units in the country.

Ten-ton Easton side-dump cars are pulled from the quarry floor up an incline of trackage to the crusher by a double drum hoist. This hoist operates with two barney cars on balanced operation, a loaded car being pulled up while an empty car is being let down. The rope speed on this hoist is 600 ft. per min., and the hoist is driven by a 250-hp. General Electric motor. The cars are then moved in trains of three to a point slightly beyond the primary crusher by a 15-ton gasoline-driven locomotive, and a cable running along the track is hooked to the cars for spotting. The cars are then dumped successively by tipping with a hook attached to an overhead cable running through an electrically driven double drum hoist. The cars empty into a specially designed hopper sheathed with 1-in. steel plates, of ample capacity to hold three or four carloads of cement rock. This hopper feeds the rock to the crusher, which is immediately below, without bridging or necessity for barring and has proved very satisfactory.



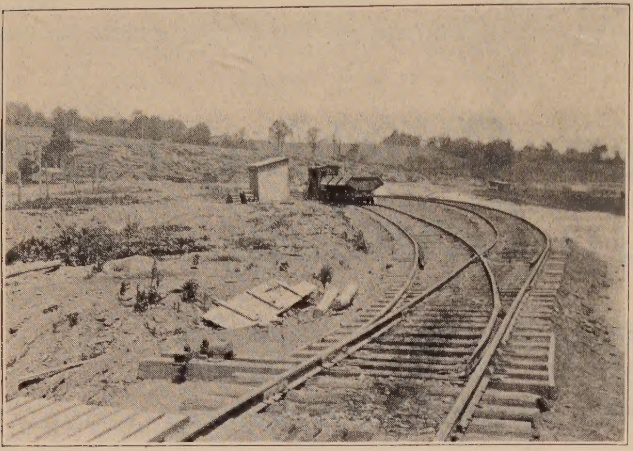
Side-dump cars of 10 tons capacity bring rock from quarry to crusher



New primary crusher has capacity of 400 tons per hour

Primary Crushing Equipment

The new primary crusher is a Pennsylvania slugger roll unit having a capacity of 400 tons per hour. The roll is 36 in. in diameter by 60 in. long, and will take rock up to 1½ tons, reducing it to 8-in. cubes. Eighteen slugger teeth are mounted on the roll and are built up by welding as they wear down. The bodies of the teeth are built up to a little less than 4 in. high with hard carbon rod. The wearing surface of the teeth is a veneer of Stellite ⅛ to 3/16 in. thick. At times the Stellite wears entirely from a tooth and the hard carbon body of the tooth is exposed to the wear. When this takes place the tooth wears down very rapidly. It has been found best to make a good inspection of the teeth twice a week and coat with Stellite such parts as need it. This unit is driven through a 14-strand "Cogbelt" driven by a 350-hp. General Electric motor, power being shut off when the charge has been reduced.



View from upper level of crusher house, showing inclined tracks leading up from quarry floor

The Secondary Crusher

From the primary crusher the rock drops on a 36-in. pan conveyor with 8-in. sides and is carried to the secondary crusher. This is a model SXT-14 Pennsylvania hammermill built to handle 400 tons per hour with reduction from 8-in. cubes to 1 in. This hammermill is driven through a pin type flexible coupling with 5-in. double ply leather coupling belt by a 500-hp. General Electric motor at 700 r.p.m. The conveyor, which is about 40 ft. long, is driven by a 15-hp. electric motor through a Polysius speed reducer.

Dust Collecting System

All dust from both the primary and secondary crushing units is handled by means of a Norblo dust collector system, the fan being driven by a 25-hp. electric motor directly connected. This system is working very well and no difficulty is experienced from the dust which frequently makes crushing plants mean places in which to work.

Grinding in Four Tube Mills

As the stone comes from the secondary crusher it drops to a 36-in. inclined rubber belt conveyor which takes it to the storage bins over the mills, a distance of approximately 175 ft., or to the stone storage piles if desired. From the storage bins the 1-in. stone goes to Polysius tube mills for fine grinding. This grinding is done with the addition of 36½ per cent of water and is ground so that 92 per cent of dried slurry will pass a 200-mesh screen. There are four of these raw mills, each of which will grind more than 80 barrels of material per hour. The crushed rock is fed into these mills by Polysius rotary table feeders driven through worm gear speed reducers by 5-hp. shunt wound motors.

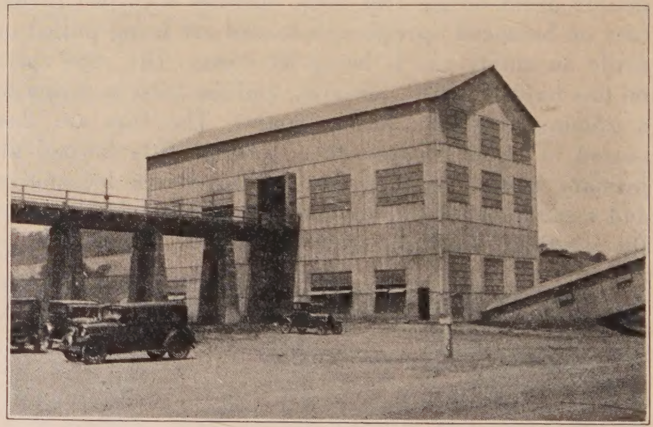
The slurry is stored and thoroughly mixed in two batteries of silos, eight of 17 ft. diameter and four of 24 ft. diameter. Both air and mechanical agitation keep the solids in suspension in the water. These slurry mixing silos are kept under very close chemical control and a remarkable uniformity of slurry results.

The Kiln Feed

From the silos the slurry is pumped by Polysius pressors to the kiln feed tank and fed from these tanks to the kilns by ferris-wheel slurry feeders. Each kiln is driven by a 60-hp. variable speed direct current motor. As an interesting sidelight, the motor required to blow the coal into the kilns is also a 60-hp. motor and practically the same amount of power is used to blow this coal into the kiln as is used to drive the kiln itself. Powdered coal is used for fuel, giving a temperature in the burning zone of approximately 2,700 deg. F. The pyrometer at the stack end of each kiln is connected to a "Tapalog" continuous recorder which keeps a record of the temperature of each kiln, constant care being exercised to keep this stack-end temperature about 700 deg. F. A recording vacuum gauge is also attached to each stack to keep track of the draft. A clinker cooler is an integral part of each kiln, and the cooled clinker is discharged at about 500 deg. F.

Grinding the Finished Product

After leaving the cooler, the clinker passes through a Polysius 36 by 42-in. double roll crusher, which reduces it to ¾-in. size, discharging it to a pan conveyor, thence through an elevator to an outside covered storage. A traveling crane reclaims it from this storage and feeds it to the finish tube mill bins, then through a Polysius double feeder and into the finish tube mills, where final grinding of the cement takes place. The finished product is taken through a Fuller-Kinyon pneumatic system to the storage silos, from which the cement goes to the baggers, or in case of bulk cement directly into the cars for shipment. The silo capacity for the storage of finished cement has been increased by about 160,000 barrels during the past year, giving a total storage capacity for finished cement of about 480,000 barrels.



Keystone Portland Cement Company's new crusher house at Bath, Pa.

Air for the slurry pumps and the Fuller-Kinyon system is furnished by Chicago Pneumatic Company compressors, two of which each supply 1,500 cu. ft. per minute and a third unit supplying 3,200 cu. ft. per minute.

Mehren to Lead P. C. A. in New Period of Activity

Industry Selects Man of High Caliber to Full-Time Position—President-Elect to Take Helm in September

IN the election of Edward J. Mehren on July 14 as president of the Portland Cement Association, to be in active charge of the association's affairs, that organization has taken the first important step in a more aggressive and constructive program of research and promotion.

It may be taken for granted, as pointed out by one cement company official in a private interview with a representative of the *Cement Mill Edition* of CONCRETE, that a man of the caliber of Mr. Mehren would not undertake the direction of the affairs of the cement industry's largest trade association unless he were given assurance that the members of the industry have swung around into a co-operative mood.

Edward J. Mehren, president-elect of the Portland Cement Association

It may even be said that at this early date an improved feeling exists. Those who have discussed the appointment of Mr. Mehren have been unanimous in the opinion that he is one of the few men who could be depended upon to lead the cement industry back to its former spirit of aggressiveness. He is in a position to grasp the true situation, with its many ramifications.

Mr. Mehren has been prominent in engineering and business paper circles through his participation in the work of engineering societies and the McGraw-Hill business publications. For many years he served the McGraw-Hill Publishing Co. in various editorial capacities, and as vice-president, having recently been in charge of the company's activities in the Middle West, with headquarters at Chicago. He has been at various times a member of the executive committee of the New York Building Congress and father of its well known craftsmanship awards system; director of the American Road Builders' Association, member of the committee on highways and motor transport of the U. S. Chamber of Commerce; chairman of the Marketing Problems Committee, Illinois Manufacturers' Association. He is a member of the American Society of Civil Engineers, of the Western Society of Engineers, the University Club, New York; the Union League Club, Chicago. He is a graduate of Loyola University, Chicago, and of the University of Illinois. Mr. Mehren assumes his new office September 1, with headquarters at the association's general offices in Chicago.

By electing a president from outside the industry who will devote his whole time to the position, the Portland Cement Association has broken two precedents of long standing. Heretofore the leader of the association has been a president of one of the cement manufacturing companies. During his term of office he has not only guided the work of the association but has also continued to operate his own company. The duties of association president are so heavy, however, that the industry has recognized the unfairness of continuing to impose this burden upon the president of any one of its member companies.

Hundreds Return to Work as Cement Plants Reopen

A number of cement plants reopened early in July, among them the Consolidated plants at Fredonia, Kans., and Cement City, Mich., the Aetna plant at Fenton, Mich., and the Lehigh plants at Mason City, Iowa, and Mitchell, Ind.

Demand at the Kansas plant is such as to warrant the plant continuing operation for a considerable time. The Cement City plant was closed early in the spring and, it is expected, will continue operation until perhaps late in August. The Fenton plant had been shut down since the first of the year and is now employing about 100.

The $160,000 reconstruction program begun May 1 completed, the Mason City plant reopened July 1. The new equipment consists chiefly of a filtering installation. Four hundred men returned to work when the Mitchell plant reopened after having been shut down since the beginning of the year.

Finding Undeveloped Sources of Fuel for Cement Plants

Some Low Grade Fuels of Short Flame Class—Difficulties of Use Greatly Exaggerated—Can Be Mixed with Others of Long Flame Class

By E. T. ELLIS, F. J. I.
Ecclesall, Sheffield, England

In giving consideration to fuels for cement factories, some of those of the non-caking class should not be overlooked. Certain of these are being dealt with specially in this installment on account of their importance, but there are others which are also worthy of careful consideration.—The Author.

OTHER low grade fuels which are apt to be overlooked, unless a special note of them is taken, are the various carbonaceous residues of the short flame class. It is popularly supposed that only low grade fuels of the long flame class are much used in cement production, but that is a fallacy which ought to have been exploded long ago. Here again some of the most important are specifically dealt with in this article; but there are others which yield a short flame under ordinary firing conditions, and which, therefore, are almost equally worthy of consideration.

The disadvantages of using low grade fuels of the short flame class have been grossly exaggerated in many other fields besides that of cement manufacture, as a glance at the published accounts will soon show. The point to remember is that if a better flame is required by cement companies, these short flame fuels can be mixed readily with others of the long flame class, and if a combination of the two is fired together a very wide range of flame length will be furnished.

Anthracite Spoil Bank Shale of Non-Caking Class

This shale is only abundant in districts where much anthracite is mined, and varies considerably in composition. Types which are suitable for use in cement manufacture show a minimum fixed carbon content of 88 per cent and a maximum fixed carbon content of 96 per cent, this last being, however, an unusual feature. All the constants in this and other analyses apply to fuel which has been thoroughly dried. The total carbon content should also be carefully watched, this being made up of the fixed carbon plus the carbonaceous portion of the volatile matter. In samples of anthracite spoil bank shale of the non-caking class which are suitable for cement making this should range from 90-96 per cent, but many samples containing much less will be offered.

Cement operators will also find if they make careful tests that small quantities of hydrogen are present in this low grade fuel. The minimum quantity as a rule is 2.5 per cent, while the maximum as a rule is 4 per cent.

Passing on to the volatile matter content, tests should always be made at 900 deg. C., and the percentage in the useful types so far as cement production is concerned should be from 4 to 8 per cent. The ash in the best samples of this low grade fuel is insignificant, and their calorific value excellent when quite dry.

The modus operandi in regard to anthracite spoil bank shale is relatively simple. Passage along an endless band arrangement is hardly called for, unless it is known definitely that lumps of non-carbonaceous shale are present, when they can be thrown out. Some will find it desirable to heat at 900 deg. C. in order to get rid of all possible volatile matter, while in some instances cement plant operators will find it to their advantage to mix it with 25 per cent of its own bulk of bituminous fuels, which fire more readily. In any case the single low grade fuel or the combination of the two is finely ground, and used for cement burning in the form of the usual intensely hot tongue of flame.

Anthracite Steam Coal Slack of Non-Caking Class

Cement manufacturers who operate in districts where pure anthracite is not mined, but where there are deposits of the so-called anthracite steam coal, will be able to obtain slack of the non-caking class which is quite usable, and in some cases excellent as a fuel for cement burning. The analyses, however, of the different samples should be carefully watched, and although there is a fair range of safety, liberties should not be taken unduly in this connection.

The fixed carbon content of anthracite steam coal slack for use in cement burning should at least be 82 per cent, while in some really high grade samples 92 per cent will be detectable, provided that the refuse is perfectly dry. The total carbon content should also be carefully watched, this comprising the fixed carbon and the carbonaceous portion of the volatile matter. The usual range of safety is 90-94 per cent, but there is some variation, though few samples will go much higher than 94. As regards the hydrogen content, this should be kept as low as possible, and does not vary much from that of actual anthracite spoil bank shale already commented upon, being from 2.5 to 4 per cent as a rule. Regarding the volatile matter content, this again should be carefully watched, but as a rule it is much higher than that of anthracite spoil bank shale proper. Allowing a fair range of safety in this connection, the minimum amount so far as cement burning is concerned should be 5 per cent, while the maximum should be 15 per cent. The ash content in carefully sorted samples is very small, while the calorific value ranges from good to excellent, according to the dryness and the amount of mineral matter present.

The modus operandi resembles that already mentioned in the case of anthracite spoil bank shale. Lumps of other materials are frequently present, but can readily be picked out. The slack itself, as its name suggests, is mostly small in size, and any unusually large pieces can be separated by means of an endless band screen. Sometimes rescreening of this material is advisable, in order to remove a fair proportion of dust, but analyses should then be made of what goes through the meshes of the screen and what remains on the top, as in some instances the dust is of higher calorific value than the coarser material.

Anthracite steam coal slack of this class, like anthracite spoil bank shales of the non-caking class, does not make good briquettes unless a large amount of tar or pitch is mixed with them. Each can be bulked up, however, with bituminous coal if a better flame is wanted, and the separate fuels, or any combination which may be made of them, should in any case be fired in the form of a fine powder for actual cement burning, although for steam raising in other parts of the cement mill firing of the briquetted refuse is very satisfactory.

Caking Bituminous Coal Mine Culm of Long Flame Class

Passing from a pair of non-caking low grade fuels to one of the caking type, mention may be made of caking bituminous coal mine culm of the long flame class, as certain types of this are very satisfactory fuel in cement factories.

Cement men should carefully watch the various analyses, however, which will be supplied to them by would-be vendors, and should take many of the statements which are made by such firms with an open mind.

The fixed carbon content does not compare favorably with any of the low grade anthracite fuels, but in spite of this deficiency, cement companies can use large quantities of coal mine culm of this class. A margin of safety should be allowed, and no sample with less than 58 per cent of fixed carbon should be purchased. It is, as a rule, possible to obtain caking bituminous coal mine culm yielding a long flame with 68 per cent of fixed carbon; but these cost more, and may have to be brought from a greater distance.

Regarding the total carbon content, which includes the fixed carbon and the carbonaceous portion of the volatile matter, no sample of coal mine culm of this group should be purchased which shows less than 75 per cent, while as a rule it will be impossible to purchase any sample which shows more than 85 per cent.

The hydrogen content should be carefully watched, and 5 per cent should be the usual amount in well dried samples. Then, as regards the volatile matter content, this should be estimated at 900 deg. C. and should not exceed 36 per cent. Samples with a lower volatile matter content are often offered. While some of these may be better, a low grade fuel with a high volatile matter content does not possess the objectionable features which many cement operators believe it to possess.

The ash content of caking bituminous coal mine culm of the long flame class is apt to be very variable, and no satisfactory constant can, therefore, be given here. The calorific value is fair to good, but this depends largely on the ash content, and also on the care which has been given in originally drying the culm before delivery.

The modus operandi in this instance consists of passing the caking bituminous coal mine culm along an endless band arrangement, so that it can be preliminarily picked over, in order to remove pieces of stone, and lumps of obviously unburnable shale. Following this, it is usually desirable to run it along an endless band screen, as most samples contain much dust, which may often with advantage be separated from the rest. Analyses of the dust, however, and of what remains on the band screens should invariably be made, as in some instances the calorific value of the more finely divided portion is greater than than that of the coarse.

These caking bituminous coal mine culms of the long flame class can with great advantage be diluted with a big quantity of other low grade fuels, such as the anthracites with a low volatile matter content. Equal portions of any two can safely be taken, and if this is done, assuming that one has a volatile matter content of 4 per cent at 900 deg. C. and the other has a volatile matter content of 36 per cent at the same temperature, the volatile matter content of the combination will average 20 per cent, which means that the fuel will last much longer when fired in the cement factory, although the character of its flame will be decidedly altered.

Hard Coking Bituminous Coal Slack of Short Flame Class

Passing on now from a low grade fuel of the long flame class to one of the short flame class, an important member of this group is found in hard coking bituminous coal slack. The composition of this varies very widely. Cement executives should stipulate that it shall be delivered to them in a dry state; otherwise much capital will have to be expended on getting rid of big quantities of unwanted water.

Hard coking bituminous coal slack in a dry state can reasonably be expected to reveal on analysis the presence of 72 per cent of fixed carbon as a minimum, while however carefully it is purchased it will not yield more than a maximum of 82 per cent. The total carbon content of usable samples, so far as cement mills are concerned, varies in rather different proportions, the minimum from the safety point of view being 86 per cent, and the maximum reasonably obtainable is 90 per cent. The hydrogen content is, as a rule, under 6 per cent. Many samples show only 4 per cent, while some reveal the presence of as much as 5.5 per cent. The volatile matter should be estimated at 900 deg. C., and this again exhibits a considerable amount of variation. None should be bought which does not yield at least 16 per cent when carefully tested; but one must also avoid going higher than 26 per cent, as fuels with a high volatile matter content are by no means always of high calorific value. The ash content is, as a rule, small in amount; but this is subject to some variation, and in any case requires to be carefully estimated. The calorific value of those types of hard bituminous coal slacks of the short flame class containing a small amount of ash and moisture ranges from good to high.

As regards the modus operandi, it is always advisable to pass these hard coking bituminous coal slacks along an endless band arrangement for preliminary examination, in order to get rid of stone and obviously incombustible shale. Treatment on a band screen is, however, often an important subsidiary step, as the slack is a mixture of fine powder and coarse material. When this screening has been done an analysis of each type should be made. If the composition of the coarse resembles that of the fine, the coarse material should be finely powdered, and then emptied on to the same stack as that to which the fine material has already been taken. Firing of these fuels alone in actual cement burning is not recommended, for although an intensely hot flame is produced, it is not sufficiently lasting. An important third step, therefore, consists of reducing the volatile matter content by the incorporation of a proportion of fuel which itself contains very little, say 4 per cent anthracite spoil bank refuse. If equal weights of these two fuels are mixed, the total volatile matter of the combination will be down to 15 per cent, and when this constant has been attained, all that is necessary is to mix the combination with a fair proportion of finely ground coal or coke ordinarily used in cement firing, and burn the two together in the usual way.

(The final installment of this series, in next month's issue, will describe other low grade fuels in the group here described.)

San Jose Cement Co. Projects California Plant; Public Offered Stock

California and eastern capital to the extent of $19,500,000 is backing the newly formed San Jose Cement Company, Ltd., according to the *San Francisco Chronicle.* A permit to sell stock to the public was issued by the State Corporation Department of California on June 23.

The new concern plans to erect a plant about eight miles south of San Jose, near the station of Mercury, on the New Almedan branch of the Southern Pacific. The plant will have an initial capacity of about 3,500 barrels daily and will produce high early strength cement.

The San Jose Cement Company was formed under the laws of Delaware on April 10, 1931. Capital structures of the company include 225,000 shares of participating preferred and 1,500,000 shares of common stock, all of $10 par value. The prior preferred will bear a 7 per cent cumulative dividend, while the participating preferred will be entitled to 7½ per cent dividends after payment of the prior preferred claim.

In addition, the participating preferred is entitled to receive 25 cents per share additional along with the common, after payment of the preferred dividends. Thereafter, surplus earnings go to the common stock.

Under the permit granted by the Corporation Department, the company may offer 225,000 shares of prior preferred and 225,000 shares of common, in units of 1 and 1, at $10 per unit. Or it may offer 170,000 shares of participating preferred and 85,000 shares of common in units of 2 and 1 at $20 per unit. The firm was also given authority to offer for sale any portions or units of stock as above set forth to manufacturers, contractors and or real property owners as partial consideration for machinery, properties, etc.

The company is alleged to have 30,000 shares of participating preferred stock and 1,190,000 of common outstanding and to have already acquired two tracts of land including 631 acres. In addition, the company holds a third tract under option including 548 acres, making a total of 1,179 acres under control. On these lands, it has been estimated, there is enough limestone exposed and visible for the manufacture of 89,425,000 barrels of cement.

Officers of the company include Ernest H. Dettner, San Francisco, president; Dr. Bruno Bruhn, Dessau, Germany, vice-president; Dr. Mark F. Hopkins, San Jose, vice-president and secretary, and Vincent Gerdau, San Francisco, secretary. In addition to the above, the board of directors includes Wendell C. Thomas, San Jose; Irwin H. Rice, San Francisco; F. L. Bunnell, San Jose; Captain H. L. Hatch, San Francisco, and Thomas J. Benney, San Francisco.

Central Organization to Control Entire Japanese Cement Sales

Complete control of sales throughout Japan is sought through the establishment of a central organization by the Cement Sales Association in Tokyo and six other Japanese towns, according to information received by the Department of Commerce. A draft plan has been prepared by the Onoda, the Chichibu and other committee members, and it has been laid before the all-Japan sales conference held in Nagoya.

The projected organization resembles the Cement Producers' Rengokai, which aims at control of production. The new organization is to control the marketing quantity and to attain an even distribution of goods throughout the country. At present the distribution is disappointingly irregular. A certain company, for instance, is selling more than its appropriation in Osaka and less than specified in Nagoya, in both cases paying fines. A uniform distribution is highly desirable, and the proposed central organization will answer the need.

No agreement has, however, been reached, and the matter is to be discussed further.

Marquette Doubles Capacity of Barge Loading Equipment

New loading equipment installed by the Marquette Cement Manufacturing Company on its Peru river platform at LaSalle, Ill., was placed in operation on July 2. Six hundred twenty-five cu. ft. of cement are pumped to the barges per minute, more than doubling the former capacity.

Lehigh Profits for Twelve Months Are $1,631,440

Lehigh Portland Cement Company profits for the twelve months ended June 30, amounted to $1,631,440, after all charges, including federal taxes, equal after 7 per cent preferred dividends to 46 cents a share on the 450,348 common shares outstanding.

Glycerine-Acetic Acid Method of Determining Free Lime

Discussion of, and Supplement to, Acetic Acid Method of Rathke—Care Necessary to Avoid Errors—Test Procedure and Results

By DR.-ING K. SCHINDLER

THIS method of quantitative determination of free lime and lime hydrate, beside lime compounds capable of hydrolysis, was published in *Tonindustrie-Zeitung*, p. 1318, in 1928, and was advanced as a variant and improvement of the familiar Emley method. Both methods are based on the reaction of free lime with water-free glycerine, whereupon the solution of calcium glycerate is titrated with an alcoholic titration medium. According to Rathke, the alcoholic acetic acid solution is preferable to the alcoholic ammonium acetate solution used by Emley, as the boiling out of ammonia, formed during the reaction, may result in various errors. On the basis of a series of experiments Rathke emphasizes the absolute freedom from water of all reagents, stating that the water formed during the reaction is negligible, according to his computations.

Avoiding Errors in Using Rathke's Method

In making use of Rathke's very practical method in a series of tests, it transpired that various conditions, if neglected, lead to erroneous results. In titrating the acetic acid solution, it is necessary that the accurately weighed quantity of calcium is dissolved in an excess of glycerine. This process presents considerable difficulty due to stubborn lump formation of the pulverized lime particles, which is not eliminated by gradual addition of the substance to the glycerine, as suggested by Rathke, nor by 24-hour heating on a sand-bath. The calcium-glycerate, just formed, soon begins to form a precipitate in the glycerine solution and cannot be dissolved again either through excess glycerine or addition of alcohol. As it can react with acetic acid only when dissolved, this occurrence easily becomes a source of grave errors. This process may be used to prepare solid calcium glycerate. The author obtained, under conditions as stated, 5.13 gm. glycerate from 3 gm. calcium, which corresponds to about 74 per cent of the theoretical yield. The precipitate was removed by suction and washed with alcohol very thoroughly, as shown by the calcium content, which was established as 42 per cent, the theoretical value being 43.1 per cent. Even in conducting the reaction over a steam bath, the required quantity of acetic acid solution producing a clear glycerine solution becomes reduced after several hours, which leads to the conclusion that the solution of glycerinate is of colloidal nature. Another source of error in this method appears in the titration of glycerinate solutions prepared, as described further, with the utmost care. As the titrating solution is added heated or at normal temperature, slowly or rapidly, variations in its consumption are recorded; if cold and added quickly, the recorded value is up to 30 per cent higher than the correct one. It seems rational to assume a soluble acid calcium salt of acetic acid as an intermediate step in the reaction, which requires a fixed time and temperature for its change into an insoluble neutral salt.

To avoid all difficulties, the following procedure is suggested, which guarantees accurate and immediate results.

The Procedure

The titration solution is made, as suggested by Rathke, by dissolving 7.5 gm. pure crystalline acetic acid in one liter of absolute alcohol. Methyl alcohol is preferred due to its lower cost. Titration begins with a calcium glycerinate solution of known lime content, using phenolphthalein as an indicator and proceeding empirically at first. The original materials are purest calcium carbonate and double distilled glycerine. The required calcium oxide is obtained by igniting small carbonate quantities to constant volume; this process must be repeated before every operation.

A quantity of 0.05 gm. calcium oxide is rubbed to complete homogeneity, without previous breaking up, with a few drops of glycerine in an agate or glazed porcelain mortar. The mixture is thinned through further addition of glycerine and is transferred carefully to an Erlenmeyer flask, whereupon the mortar is used again two or three times with fresh glycerine. A total quantity of 10 cc. glycerine is sufficient and satisfactory for the reaction. The flask is placed, uncorked, over a steam bath for 5 minutes. Almost immediately the turbid suspension of lime particles clears to a transparent liquid, which should contain no solid particles. After the specified interval, 20 cc. absolute methyl alcohol is added, as well as a few drops of a 2 per cent phenol-phthalein solution in methyl alcohol. The solution is then heated to incipient boiling. Titration begins, with constant reheating, adding the titrating solution one cc. at a time, until the red coloring of the liquid begins to disappear. The solution is then added drop by drop until the liquid is entirely colorless.

Determining Free Lime in Cement

In determining free lime in cement and other substances, weighed quantities of the above are rubbed together with glycerine in the manner described, as otherwise no guarantee is offered for the complete solution of free lime, and one proceeds as above. With a little experience, no diffi-

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Translated from *Zement*, April 23, 1931, by Margaret A. Corbin.

culty is encountered in titrating the dark liquid without filtration, as the heavy constituents settle rapidly in boiling alcohol. The addition of phenol-phthalein should be measured to be on the generous side. If scientific accuracy is desired, the cooled liquid is removed by suction upon titration, washed with alcohol and the reheated filtrate is titrated as above.

A few examples:

	Lime	Cement A	Cement B	Cement C	Raw Cement Mix D
Quantity weighed	0.05 gm.	1 gm.	1 gm.	1 gm.	1 gm.
Quantity of acetic acid solution required	14.2 cc.	5.0 cc.	8.8 cc.	7.2 cc.	5.4 cc.
ditto	14.1 cc.	5.1 cc.	8.9 cc.	7.1 cc.	5.4 cc.
ditto	14.15 cc.	5.1 cc.	8.7 cc.	7.2 cc.	5.5 cc.
As excess	14.1 cc.	5.0 cc.	8.8 cc.	7.2 cc.	5.4 cc.
Quantity of acetic acid solution required	14.2 cc.	5.05 cc.		7.3 cc.	
ditto	14.2 cc.				
Average	14.16 cc.	5.05 cc.	8.8 cc.	7.2 cc.	5.43 cc.
Free lime content, per cent		1.78	3.11	2.54	1.90

The table shows relatively high values of free lime for cements B and C. This is due without doubt to the long storage period of these two cements, during which the air moisture had a chance to effect some hydrolytic action. A further indication of this appears in the high loss on ignition of these two cements, namely, 5.72 and 5.15 per cent. In this case the high content of free lime or calcium hydrate is no symptom of insufficient calcination of clinker. On the other hand, absorption of carbon dioxide from the air results in a neutralization of the original or subsequently formed free lime, which escapes observation. An indication of the extent of calcination can, therefore, be obtained on the basis of such observations, only on testing a sample of unsprinkled clinker immediately upon calcination. To this end the method here described is most suitable, as it yields immediate results and may be easily carried out in any laboratory.

Right Appeal Important in Selling Safety to Cement Plant Workmen

In order to have smooth and efficient operation, it is essential to have co-operation. Co-operation is a quality noticeable and forthcoming when there is a feeling of contentment and satisfaction applicable to mankind. What is the definition of co-operation? It means joint action. I have heard another definition of co-operation not given in the dictionary—co-operation is something that you do for others that you don't have to.

We have been trying to get the idea of co-operation over to the men and in some cases it has not been an easy task.

The day of the "hard-boiled" foreman is gone. It isn't necessary any more to "bully" men in order to get them to do their work. Years ago it was possible to get work done by threatening men with loss of their jobs or by sheer force. But today the work can be done in a more safe and efficient method by approaching the individual in the right manner. All men are not alike. What one man might consider as a joke, another might consider as a rebuke. Explain the job to the man. Tell him about the operations of the department, how one operation depends on another. Explain to him that other operations in the mill are dependent on the manner in which he does his work and the kind of work he produces. If you tell him these things he will realize that his job is equally as important as the next man's job and will entertain a certain pride in doing it well.

If the man discharges his duties in a satisfactory manner, let him know about it at the time. Don't wait until he is gone to tell someone else how well he performed his duties. Give credit where and when credit is due.

Explain to him about the safety program being carried on, the safety achievements that have resulted only through the co-operation of every employe in the plant. Tell him that it is necessary for him to work safely as well as efficiently, and that all the other employes have pledged themselves to do the same. If a man is approached in the right manner, I fail to see, with but few exceptions, why he will not offer to co-operate to the fullest extent.

Analysis of a number of accidents usually shows some to be due to a man's desire to manifest a feeling of worth or to gain social recognition. A man is performing a certain job and his foreman tells him that he should do it otherwise. When the foreman is gone, the workman goes right on doing the job in the same manner as before. The man probably had no intention whatever of disobeying orders. Perhaps there were more ways of performing this job, but the workman had chosen this method. Perhaps he did not know of any other method. It was his place, however, to inquire about and learn other ways of doing the job, but he had some reason for not doing so. He was doing it for one or two reasons, or perhaps both—a feeling of worth, or for social recognition.

If the foreman had said to the workman, "John, I know you can do it this way better than most of the other men, but for a particular reason it has to be done the other way," the chances are, this man would have had a feeling of worth without having had to produce an exhibition of his skill.

Condensed from paper presented at Regional Safety Conference, Davenport, Iowa, April 2, 1931.

Responsibility for Damage from Use of Explosives

The Institute of Makers of Explosives has devised two forms of release from liability for any damage which may be done by blasts supervised by explosives manufacturers' field men, where conditions may occur which can neither be foreseen nor guarded against.

The forms have been adopted to avoid any questions or controversies which might arise in these matters. The users of explosives accepting free services of explosives companies' employees will be called upon to sign one or the other of the release forms.

Alpha Portland Declares July 1 Dividend

The Alpha Portland Cement Company in June declared a dividend of 25 cents a share on its common stock, payable June 25 to stock of record July 1. Three months ago a similar dividend was paid.

EDITORIAL

Taking on a New Pilot

THE election of Edward J. Mehren, vice-president of the McGraw-Hill Publishing Co., as full-time president of the Portland Cement Association has struck a favorable note of response in the entire cement industry.

No one overlooks the fact that the new president, who is to be in active charge of the association's affairs, with headquarters at the general office in Chicago, will have a heavy load of responsibility on his shoulders.

On the other hand, the opinion most generally expressed is that Mr. Mehren is one of the few men with the necessary qualifications to tackle the job.

With prices to be stabilized, differences to be reconciled and the co-operative spirit to be restored, only a man with the courage of his convictions can fill the place.

When a whole industry is suffering from the doldrums, it does require both courage and faith on the part of someone, if a normal state of mind is to be re-established.

We believe the new president-elect has both courage and faith. His election has already created a better feeling, and his leadership should restore the former spirit of aggressiveness within the industry.

When High-Early-Strength Cement Becomes Standard

THE time was, not so long ago, that an occasional spokesman for the automobile industry predicted that the sedan body would eventually become the standard.

Others disagreed with those prophecies; but today everyone knows the results. Except for old cars recovered from oblivion and somehow kept going by 16-year-old boys, the so-called touring body is almost as much of a rarity as horse-drawn vehicles.

A parallel situation probably exists in the cement industry with respect to standard portland cement and high-early-strength portland cement. The prediction can now be made with some assurance that in five years from today the standard cement in general use will be the kind now known as high-early-strength portland cement and thought of as a special product.

Ever since it became known that high-early-strength cement can be made at one burning by the use of long kilns, the trend has been in the direction of long kilns. Such installations are being made this year. Firms that specialize in the design and manufacture of cement mill equipment are working on the problem from other directions, but with the same object in view.

Surely, the cement industry can not fail to see the advantages that will come to concrete as a material of construction when the long wait over the 28-day curing period can be eliminated. When concrete roads and pavements can be opened to traffic on the morning of the second day following the placing of concrete, the interruption to traffic can be shortened by several weeks. When concrete in buildings and similar structures attains a safe working strength in less than 24 hours, form work can be removed about as soon as the construction crew can get around to it. Smaller quantities of form material will be required, and the cost of concrete form work will be reduced accordingly.

With a product such as the present-day high-early-strength cement in general use, concrete construction work of every kind will be speeded up, and the material will be favored in places where it is now avoided.

Cement mill executives who lack the vision to see the trend toward high early strength, or those who do see it but fail to prepare for it, are betting against progress in our own industry in the same way that all of us have seen in other industries.

The Year's Work of the A. S. T. M.

ALTHOUGH the recent annual meeting of the American Society for Testing Materials gave but little time to the problem of cement and cement manufacture, much has been accomplished in that organization during the past year through the studies inaugurated by the reorganized Committee C-1 on Cement.

The reorganization of this committee was effected primarily to facilitate its studies of high-early-strength and standard portland cements, and of masonry and plastic cements, and this work is being prosecuted in accordance with the schedule outlined in a two-year program. Separate sub-committees are gathering data on each of these cements.

Since the tentative standard for high-early-strength cement was adopted in 1930, much has been accomplished toward creating confidence in this type, now that it has been shorn of its mystery.

The raising of specification requirements for standard portland cement has, likewise, resulted in a tuning up of manufacturing equipment and processes, and a corresponding increase in confidence in that product.

In the progress made by the A. S. T. M. in the study of the finished product, the society has accomplished much for the cement industry during the last twelve months.

West Penn's Mining and Crushing Methods and Costs

Geology of Rock on Company's Property—Exploration Supplied by Oil and Gas Wells—Drilling and Blasting Methods—Double Entry System of Mining

By GEORGE A. MORRISON[1]

In this first article of a series of three, the author describes the geology of the rock formations on the property of the West Penn Cement Co. and the mining methods employed in bringing out the Vanport limestone used as raw material.

The second article will describe the loading and transportation operations and the crushing plant, while the final installment will contain detailed cost data.—The Editors.

THIS paper, describing the methods of mining and crushing limestone at the West Winfield, Pa., limestone mine of the West Penn Cement Co., is one of a series being prepared by the Bureau of Mines on mining practices, methods, and costs in the various nonmetallic mining districts.

Limestone Deposits of Western Pennsylvania

The limestone deposits of western Pennsylvania have been exploited for many years and have been quarried extensively at West Winfield, in Winfield Township, which lies in the southeastern corner of Butler County.

The early methods of mining were naturally crude, the workings were irregular, and hand labor predominated. Later piston drills operated by gas were used until an explosion occurred which was caused by ignition of the gas. The next step was the utilization of steam for the drills and this was followed by gas-driven air compressors. From this time on progress in mining practice was steady, and present-day operations are along modern lines.

The West Penn Cement Co. was formed about four years ago to manufacture cement from deposits at West Winfield.

Topography and Geology

The whole property of the West Penn Cement Co. lies in rough rolling hills traversed by streams flowing in a southeasterly direction to the Allegheny River. These streams have cut through the strata and exposed successive horizons of economic value. An important uplift with a northeasterly axis crosses the property. Glacial deposits are scattered over the surface of the hills.

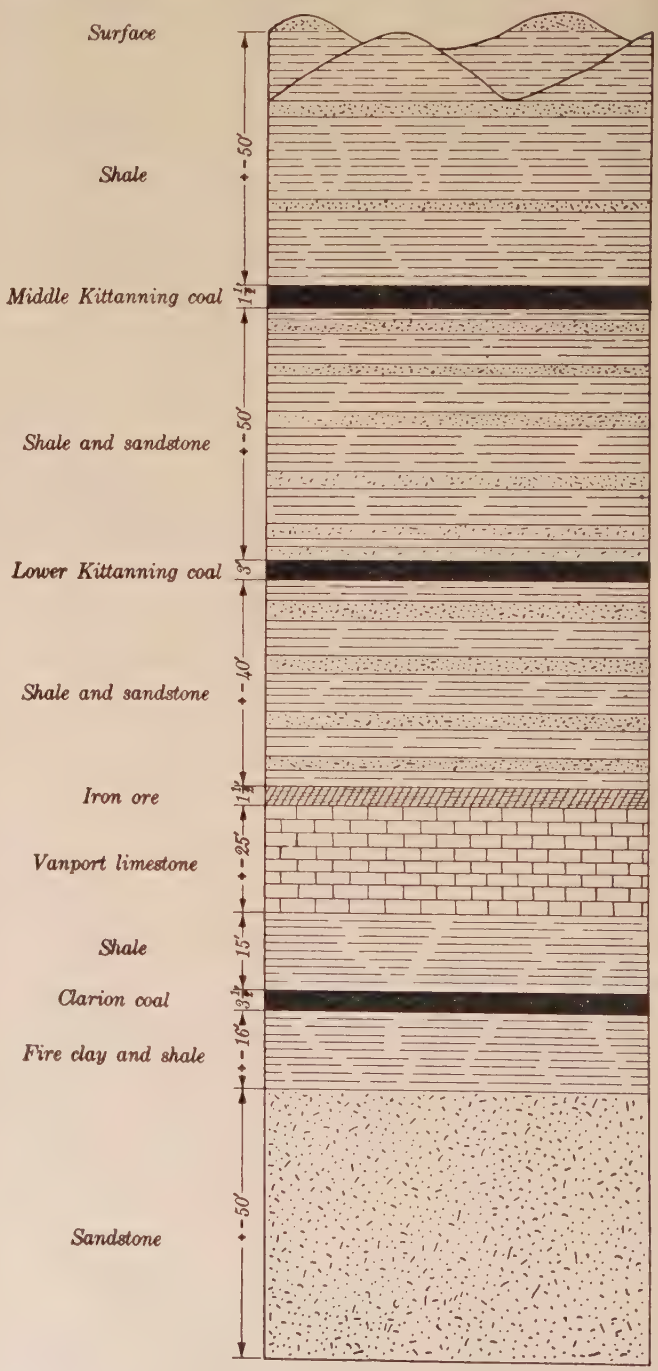


Figure 1. Vertical section showing the relation of rocks at West Winfield, Pa.

Reprinted from U. S. Bureau of Mines Information Circular 6446.

[1] One of the consulting engineers, U. S. Bureau of Mines.

A broad brecciated area, averaging some 1,500 ft. across and showing a considerable amount of movement and shifting of the beds, crosses the property in a northeasterly direction. This area contains no workable measures and divides the property into a northern and a southern part.

Deposits Mined

Figure 1 shows the sequence of the strata. All mining operations are in the carboniferous sedimentaries. The Vanport limestone and the underlying shale and sandstone are being mined while the coal that is uncovered by the removal of the shale is left for extraction at a future date.

The limestone stratum, known as the Vanport, is extensively developed throughout western Pennsylvania. It lies about 65 ft. below the Lower Kittanning coal measures and is recognized by its fossils (mostly crinoids) and other certain physical characteristics as being of marine origin.

Position of Limestone

On the West Penn property this limestone lies nearly horizontal, but in reality it forms the top of an anticline with a north and south axis. The limestone averages nearly 25 ft. in thickness on this property and is quite uniform from top to bottom.

The following analysis is typical of this limestone:

	Per Cent
Calcium carbonate	90.00
Magnesium carbonate	1.00
Silica	5.00
Alumina	2.50
Ferric oxide	1.50

The limestone rests upon 14 ft. of shale, from which it parts readily when blasted. This shale in turn rests on 3½ ft. of coal (Clarion) which likewise parts readily from the shale.

Character of Shale

The shale, which is also mined, is dark gray, of uniform character, and so dense that it must be drilled and blasted for its removal. There are no fossils in this shale, but as it lies between carboniferous strata—the limestone above and the coal below—it is of that age.

A typical analysis of the shale follows:

	Per Cent
Silica	56.0
Alumina	19.0
Ferric oxide	8.0
Calcium oxide	.5
Sulphur	3.5
Water	6.8
Volatile	4.0

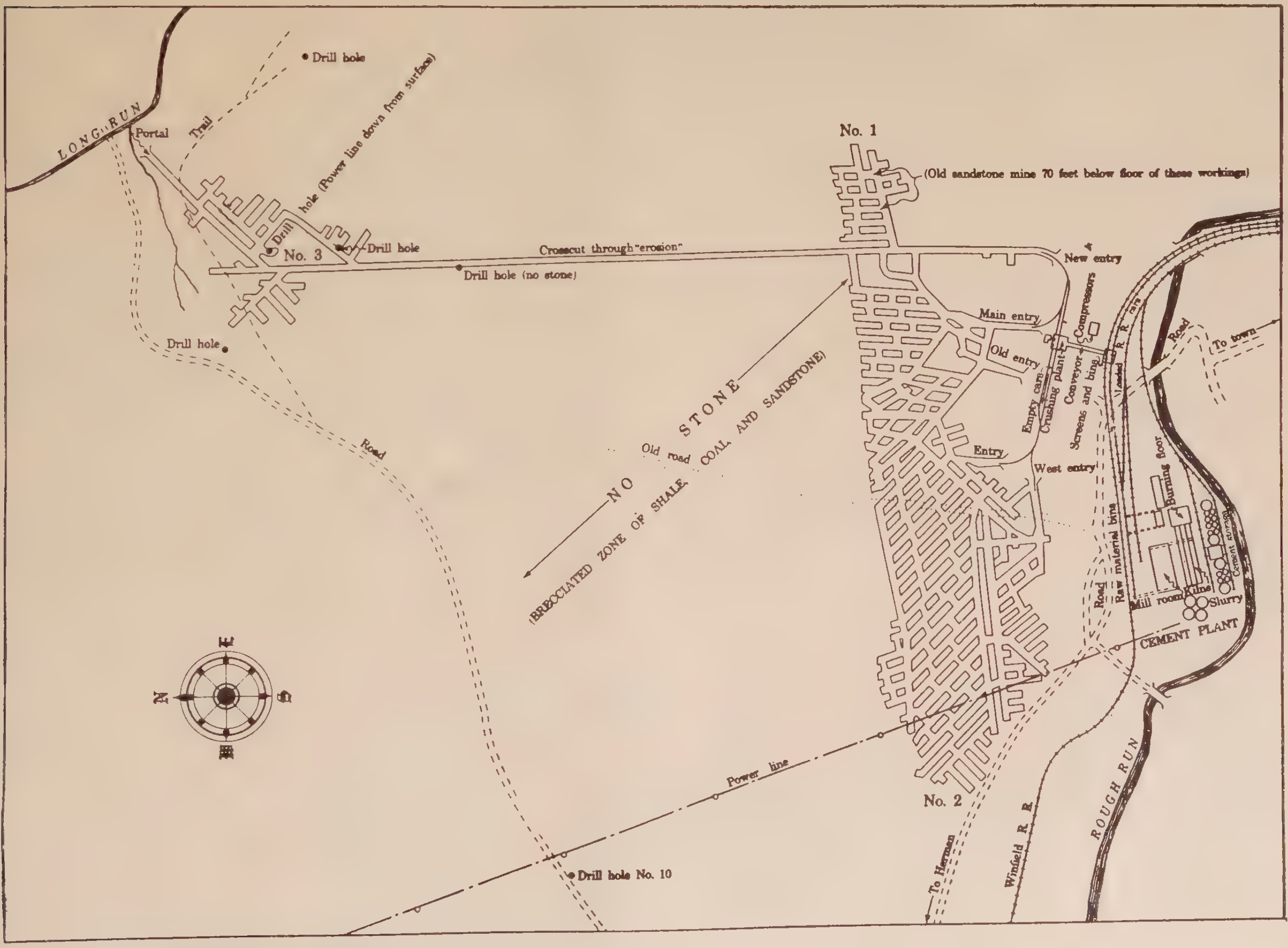


Figure 2. Plan of mine workings on cement company's property

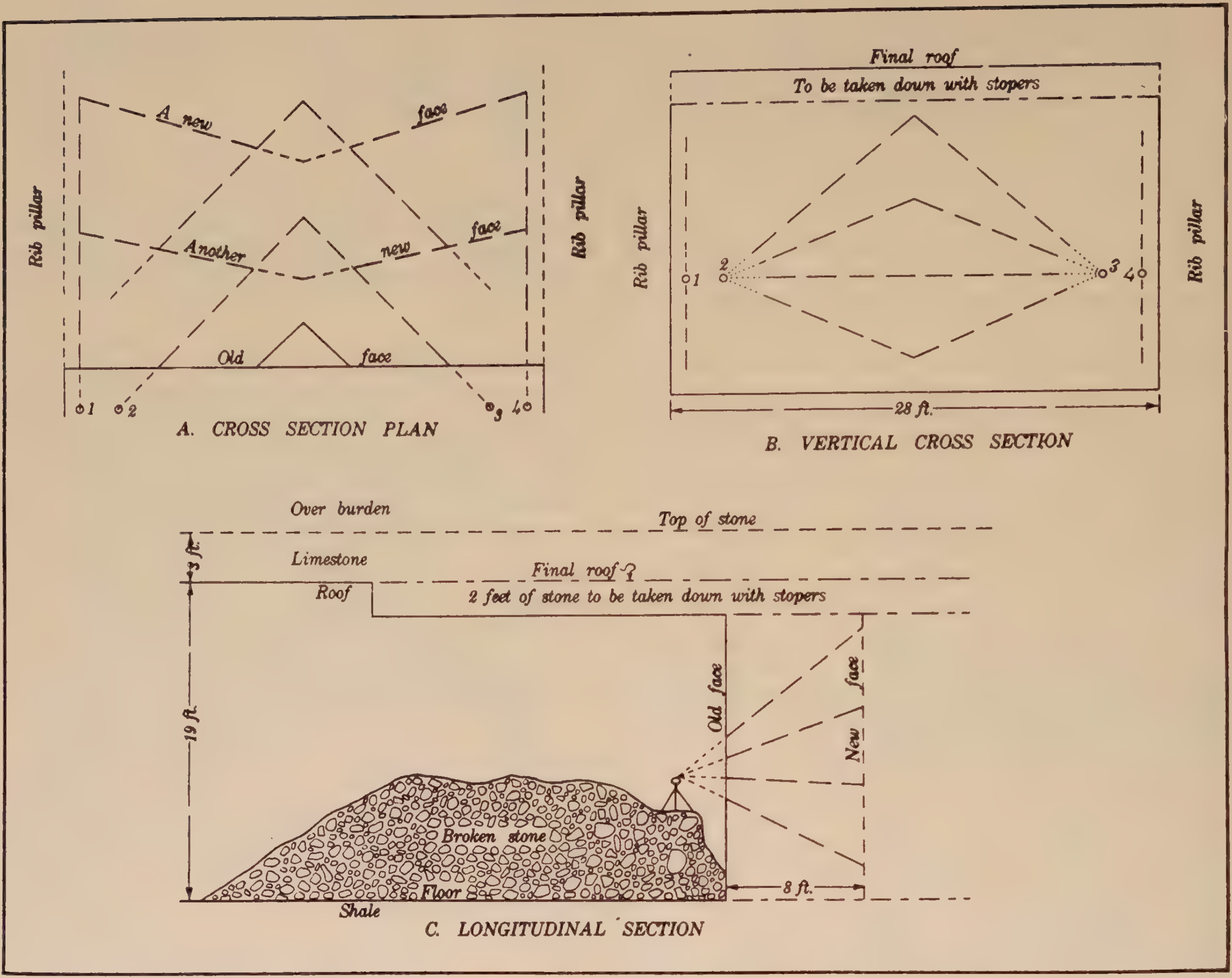


Figure 3. Drill round shown in plan and section

The Clarion coal which is uncovered by the mining of the shale is a fair grade of soft coal and has the following analysis:

	Per Cent
Volatile	33 to 44
Ash	13 to 6
Sulphur	2 to 1
Fixed carbon	52
B.t.u.	12,600

Lying directly below this coal are from 10 to 16 ft. of fire clay (known as the Clarion). This is used by the Pennsylvania Clay Products Co., and has the following analysis:

	Per Cent
Silica	57.22
Alumina	34.17
Ferric oxide	.24
Calcium oxide	1.17
Magnesium oxide	.49
Water	5.82

Immediately below the fire clay is the Clarion sandstone. This deposit is 50 ft. thick, very uniform in character, and has a high silica content. The following is an average analysis:

Silica	98.28
Alumina	.35
Ferric oxide	.61

The only impurities are occasional iron spots and knife-edge seams of interbedded coal.

Overlying the limestone are repeated layers of shale and sandstone, which are of no economic value. Among these impure and weak measures are two coal beds. The lower of these, the Lower Kittanning, is about 3 ft. thick and may be of value some day.

Exploration Supplied by Oil and Gas Wells

Numerous well drill holes driven on this property quite completely outlined the deposit on the company's land. The drill holes were primarily for gas and oil, which is found at a depth of some 2,000 ft. Many of these wells are producing at present and must be avoided in mining.

Recently holes have been drilled to determine the extent of the brecciated zone already mentioned. These holes, 5½ in. in diameter, are from 100 to 300 ft. in depth and cost 75 cents to $2 per ft., depending upon their depth and the accessibility of their location.

In some places the limestone outcrops, but for the most part it is covered with a thick mantle of shale, sandstone, and soil.

The uniformity of the stone as to its chemical analysis, physical characteristics, and extent, simplifies the mining of the deposit.

Sampling

Few mine samples are necessary, but samples are taken hourly and analyzed at the cement plant laboratory and careful check is kept on all ingredients as they are ground into slurry. Slight variations are corrected to maintain the desired analysis of the mix going into the cement.

A considerable amount of the stone mined is sold for commercial purposes. This is marketed on a basis of screen analysis specified by the purchaser. These analyses are made at the mine so the product may be kept up to the specified requirements.

Double Entry System of Mining

The flat-lying strata penetrate from the valley walls into steeply rising hills until the limestone measures often have an overburden of 200 or 300 ft. In the early quarrying the outcropping stone was first worked out. Afterwards stripping was carried on until its cost prohibited further operations by this method.

Then openings were driven into the hills for removing the stone without stripping. Some irregular pillars were left to support the roof. Soon afterwards a single-entry system was adopted, with rooms running off at regular intervals to either side. Later came the installation of the present double-entry system with rooms driven to the left off the left-hand entry and to the right off the right-hand. This system of rooms and entries with ribs left between them for support is the present practice.

The entries and rooms are 30 ft. wide, and 25-ft. pillars are left between. Openings 30 ft. wide are put through the rib pillars every 100 ft. or so.

Two or three layers of stone are left in place in the roof of these rooms and entries to support the weak overburden of shale and sandstone. The thickness of roof layers left for support varies from 3 to 5 ft., depending upon the thickness of the overburden at that point.

The floor of the workings is the top of the shale measures. The height of the workings is determined by a uniform parting layer usually occurring 19 ft. above the floor of the limestone. This height is quite constant, but in a few places in the mine it drops to 10 or 12 ft. The high, wide openings of the underground workings stand up well with little or no timbering.

Figure 2 shows a plan of the mine workings in relation to the surface layout.

During the busy season a daily production of 2,000 tons of limestone and about 200 tons of shale is maintained. There is no waste, as all of the tonnage broken is either screened and sold to the commercial stone trade or shipped to the cement plant.

Drilling and Blasting

The method of extracting the stone is a breast-stoping system whereby the opening is advanced its full height in one cycle of operations. The width of 30 ft. is taken out in a series of "V" cuts driven into the face. The center cut takes out a wedge-shaped piece to a depth of about 8 ft. Then by setting up the drill in the notch formed by the shooting of the "V" cut, holes are drilled to meet other sets of holes drilled from the original face along the rib. These are called the "angle cuts" and two of them are required to bring the full room width of 30 ft. for an advance of about 8 ft.

The drill is again set up, but this time on the muck pile resulting from the previous blast, and the cycle is repeated again and again, each time from a higher muck pile, until the last set-up is 12 ft. or more above the floor.

The drilling is arranged so that a set of four holes fanned from one set-up will meet four holes from another set-up at right angles. The drill runner lays out the holes by using a powder box as a square and a drill-steel for a straight edge so that he can determine where to start the companion holes, their angle to the face, and their depth.

The vertical arrangement of holes is also fan shaped and drilled so four holes from one set-up will meet four holes drilled from another set-up. The drilling is done so the top holes come together about a foot below the desired roof and the bottom holes about the same distance above the shale floor. The vertical distance between the apexes of the top holes and those of the bottom holes is 15 ft., and a break 17 ft. high results when the holes are blasted.

The sketches in Figure 3 show the drill round in plan and section.

After three or four rounds the face has been advanced about 30 ft. A stoper drill is then set up on top of the broken stone pile to drill 2-ft. vertical holes (Figure 3) into the roof on 6-ft. centers. These holes are blasted in units of 30 to 36 holes, and the room, then containing about 2,000 tons of broken stone, is ready for the power shovel.

In drifting, 3½-in. hammer drills are used mounted on tripods, and all holes are drilled wet. Air at 100-lb. pressure at the compressors delivers about 80 lb. at the drills. Line oilers and a good grade of liquid grease are used on all machines.

The drill steel is 1¼-in. hollow round and is fitted with lugs on shanks. The starter has a 2⅛-in. cross bit of the McLellan type and ⅛-in. decrease in the gauge is made on each 30-in. change in the steel length, so the bottoming steel (13 ft. 6 in.) has a 1⅝-in. bit.

A machine will average 165 ft. of holes per drill shift, making four set-ups and using from 6 to 9 bits. The drilling speed of the machines is 9 in. per minute, and the steel is actually cutting rock 37 per cent of the time. The balance of the drillers' time is consumed in rigging in and out, changing set-ups and steel, blowing out finished holes, and mucking out for set-ups. A helper is used on each machine, as the long steel must be bent to get it into the hole in the narrow "V" cut.

The depth of holes varies from 8 to 13 ft., depending upon the condition of the face. All drill holes are loaded by blasters on a night shift and are fired by blasting machines.

A special pulverant dynamite of 35 per cent strength is used in 1½ by 8-in. cartridges for all face shots. Another type of dynamite of 37 per cent strength and less mealy is made up in 1¼ by 8-in. cartridges for use in block-holes and stoper work. Little secondary blasting is required, as many face holes are intentionally overloaded so the blasted material is kicked as far back into the room as possible to insure its being filled with broken stone before the shovel is moved in.

All holes are tamped with at least three cartridges of tamping made up by the blasters. No. 6 electric detonators with 8 and 10-ft. copper lead wires are used. Three blasters working on a night shift prepare the tamping, make up their primers, and load and shoot all holes. No. 14 insulated copper wire is carried on fixed supports to all faces being worked from locations convenient for the blasting stations. No. 20 annunciating wire is used to connect the main lead wires to the detonator wires.

An average of 0.6 lb. of dynamite is required per ton of stone produced. This includes all secondary shooting and powder used for any other purpose.

Production of Masonry Cements Declined in 1930

Last Year's Records Show Further Recession from High Point of 1928

Following a very slight recession in production and shipments in 1929, masonry cements and other hydraulic cements exclusive of portlands experienced a rather substantial decline in 1930, according to a report compiled by the United States Bureau of Mines.

The figures represent the record of 11 plants, two of which are located in New York, two in Minnesota, and one each in Alabama, Illinois, Indiana, Kansas, Kentucky, Ohio and Pennsylvania. Masonry, natural and puzzolan cements are included.

With the figures expressed in terms of 376-lb. barrels to correspond with statistics covering portland cement, the table shows the outputs recorded in the six-year period from 1925 to 1930.

PRODUCTION, SHIPMENTS AND STOCKS OF MASONRY, NATURAL AND PUZZOLAN CEMENTS IN THE UNITED STATES FROM 1925 TO 1930

Year	Active Plants	Production, Barrels	Shipments, Barrels	Stock on Dec. 31, Barrels
1925	10	1,729,343	1,751,725	107.459
1926	11	2,104,891	2,031,851	181,928
1927	11	2,123,868	2,158.323	143.854
1928	11	2,210,404	2,213,645	137,357
1929	11	2.209,465	2.159,130	194.207*
1930	11	1,792.083	1,787,016	199.274

*Figure revised from previous report.

From the table it will be seen that production decreased 18.9 per cent in 1930 in comparison with 1929, while shipments decreased 17.2 per cent. Portland cement production decreased only 5.7 per cent in 1930 in comparison with 1929, and shipments declined only 6.5 per cent.

Ask State Take Stone Ordered for Discontinued State Plant

Representatives of the Michigan Limestone and Chemical Company of Rogers City, Michigan, have asked the Michigan state administrative board at Lansing to take possession of about 15,000 tons of stone ordered for the Chelsea state cement plant in 1929. The order was cancelled and the stone now lies on the company's dock at Detroit, it was stated.

The delegation told the board that the company's lease on the dock expires next September and that the stone and equipment must be moved, adding the state had a "moral" obligation to take the material.

Alpha Sells West Virginia Mining Properties

The Alpha Portland Cement Company has sold its Phoenix coal mining properties near Wolf Summit, West Va., to the Empire Fuel Company, who will continue their operation.

The sale includes unmined coal under 521 acres of land, 120 acres of surface land and mining machinery and equipment.

New Books and Pamphlets

Cement Rock Quarrying and Crushing

A well written 7-page bulletin on "Cement Rock Quarrying and Crushing," prepared jointly by Stewart J. Owen, Jr., safety engineer, National Safety Council, and Felix Guenther, Jr., general superintendent, Pennsylvania-Dixie Cement Corporation, has been published by the National Safety Council, 20 North Wacker Drive, Chicago, Ill.

The bulletin treats in detail the subjects of stripping, drilling, blasting, digging and loading, transportation, and crushing. Both primary and secondary drilling are covered under the heading of drilling.

Using Explosives. The bulletin contains detailed instructions and observations on the storing, transportation and thawing of explosives, as well as instructions on priming, charging and firing. The dangerous problem of handling misfires is discussed in brief.

Accidents occurring around crushers and stone storage bins, as well as those in cement storage bins, are roundly condemned as being due, in nearly all cases, to faulty layouts or the absence of substantial railings and other safety measures.

Storing, Packing and Shipping of Portland Cement

Six-Page Bulletin Issued by National Safety Council Covers Subject of Safety in This Department

A new 6-page bulletin issued by the National Safety Council, 20 N. Wacker Drive, Chicago, as Industrial Safety Series No. Cem.-5, and under the title of "Storing, Packing and Shipping Cement," is available for distribution.

Subject matter covered by the bulletin includes descriptions of hazards due to screw conveyors, cement slides, packing and loading, storing and cleaning of sacks, and the danger of accident from car movements in connection with packing houses.

The bulletin was prepared by R. H. MacFetridge, superintendent of the Birmingham plant of the Lehigh Portland Cement Co., and Stewart J. Owen, Jr., safety engineer, National Safety Council.

Accidents Cut in Half in 1931 June Safety Campaign

One Hundred Twenty-Three Plants Have Perfect Records for Month of High Production—Total of Thirteen Accidents Sets New Low Record

OF the 135 cement plants participating in the Portland Cement Association June safety campaign, 123 successfully completed the month without lost-time or fatal accident, reports received up to July 13 indicate.

It was necessary for twelve mills to haul down their safety flag before the month was over. There were 10 lost time and 3 fatal accidents. This number was divided among the various departments as follows:

Cement storage 1, coal handling 1 (fatal), filter 1, finishing 2, limestone mine 1, packing 2, quarry 2, raw 1 (fatal), screenhouse 1 (fatal), yard 1.

One mill suffered two lost-time accidents and three mills suffered one fatality each. Eight mills had one lost-time accident each.

In June, 1930, there was a total of 28 lost-time accidents reported from 129 mills enrolled in the campaign, which was the best record ever made up to that time. The June, 1931, accidents showed a 53½ per cent reduction over the previous outstanding record.

Universal Atlas Plants Make History; All Operate Month Minus Mishap

Workers of the Universal Atlas Cement Company in June established a new safety record, when all nine of the company's plants went through the month without a single lost-time accident. Although individual plants have gone for periods of several years without an accident in the past, this is the first time that all of the company's plants, quarries and connecting railroads have gone for one month without a lost-time accident, according to B. F. Affleck, president.

"At the beginning of the month we held safety meetings at all of our plants and raised safety flags to be kept flying until brought down by a lost-time accident. Thanks to the co-operation of all the workers, June 30 found the flags flying at every plant," Mr. Affleck said.

The safety work of the Universal Atlas company is in charge of Gordon C. Huth, safety director. Committees are appointed in each plant to inspect equipment, investigate all accidents or near accidents and make reports on causes and recommendations for preventive measures.

Among the company's plants which have established especially good safety records are the Hudson, New York, plant which has had no accident for 13 months since May 27, 1930; the Leeds, Alabama, plant which has had no lost-time accident since December 17; the Northampton, Pennsylvania, plant, one of the country's largest plants, which has had no lost-time accident since December 23; the Pittsburgh, Pennsylvania, plant which went without an accident from September 3, 1929, to May 6, 1931; and the Independence, Kansas, plant which has had no accident since December 30. Recently the Pittsburgh plant celebrated the awarding of the Joseph A. Holmes

Parks for Cement Plant Safety Trophies

Having once obtained a safety trophy by unceasing attention to the physical, the plants of the Medusa Portland Cement Company give thought to the artistic, achieving highly suitable settings for their awards.

This park is located near the Dixon, Illinois, plant, and is typical of those at some other Medusa plants. A floodlight, placed behind the small stone before the trophy, illuminates the latter by night.

safety association certificate of honor and the dedication of the Portland Cement Association safety trophy.

Two factors were named by Mr. Affleck as being chiefly responsible for the results secured during the June campaign. "Modern mechanical safety guards to protect workers in hazardous circumstances are installed whenever needed," he said. "This naturally tends to reduce risks to employees who may be careless.

"But no machine can be 100 per cent guarded. For satisfactory safety results there must exist a complete assumption of responsibility by operating officials and supervisory forces as well as personal responsibility on the part of the worker. We find that the most effective way to secure this personal responsibility is to talk safety, to teach it and to educate members of our organization always to think of it. Hence safety meetings are conducted; literature featuring safety is distributed and printed placards urge workers to play safe. Through these means there are developed individual caution and a sense of pride in preventing accidents that have done much to make industry safe."

Two British Cement Manufacturers Reported Liquidating

Liquidation developments have recently taken place concerning two important British portland cement undertakings. One, the British Cement Products & Finance Co., Ltd., is definitely in liquidation and has just held the statutory first meetings of creditors and stockholders, while the second, the Dunstable Portland Cement Co., is considering early liquidation.

The liquidation meetings of the British Cement Products & Finance Co., were held in London. A statement of affairs was lodged showing total liabilities £904,626 ($4,523,130), of which £593,267 ($2,966,335) is expected to rank, against assets £21,154 ($105,770). The account with the contributories discloses a deficiency of £1,422,113 ($7,110,565), the issued capital consisting of 825,000 £1 ordinary and 500,000 deferred shares of 1s. each. Henry Spence Horne acted as chairman of the board until he resigned office in November, 1929.

The company was incorporated as a public company on November 15, 1926, with an original nominal capital of £200,000, subsequently increased to £1,000,000 ($5,000,000). The issued capital was £850,000 ($4,250,000), and the company received in premium subscriptions £1,152,000, making a total cash subscription of £2,002,000 ($10,010,000). The company was formed primarily to acquire holdings in companies engaged or interested in the production or marketing of cement and cement products in the United Kingdom, or any colony or dependency, or in any foreign country, and to deal in such securities. The company was also empowered to carry on the business of financiers, capitalists, underwriters, and company promoters.

The company was promoted by the Associated Anglo-Atlantic Corporation, Ltd., the functions of which are practically confined to the holding of substantial blocks of shares in companies whose operations embrace the cement industry.

The failure and insolvency of the company are attributed to the difficult financial conditions in the latter half of 1929, which made it impossible for the company to carry out its agreement to underwrite a public issue of 850,000 preferred shares of Allied Cement Manufacturers, Ltd., another Horne company, and acute competition in 1930 in the cement industry, which caused a heavy reduction in selling prices.

At the conclusion of the hearing the official receiver remarked that so far he was unable to express a definite opinion as to the cause of failure. A resolution asking that a liquidator be appointed was passed.

The second company, the Dunstable Portland Cement Co., is also one of the Horne group, being controlled by Allied Cement Manufacturers, Ltd. While the company continues to make profits in excess of the amount required for the payment of the preferred dividend, the financial position does not, in the opinion of the directors, justify the payment of that dividend. Since the passing of the dividend on January 1, a receiver and manager has been appointed by the courts for Allied Cement Manufacturers, Ltd., and the failure of the Dunstable company to pay its preferred dividend is due now, as then, to the inability of the former concern to discharge its indebtedness to the latter.

Power Required for Belt Conveyors

Formulas and Tables Supply Information—Stress in Conveyor Belt—Table of Weights

The following formula is given for the calculation of the horsepower required to drive a belt, taking into consideration the weight of the belt:

$$\text{H.P.} = \frac{KL}{1000} \times \left(T + \frac{SB}{16}\right) + \frac{TH}{990} + P$$

Where—

K = Power constant from Table I.
L = Length of conveyor (pulley centers) in feet.
T = Tons of material, per hour.
S = Speed of belt in feet per minute.
B = Weight of belt in pounds per foot (Table II).
H = Vertical height or rise of conveyor, in feet.
P = Horsepower required for tripper (Table I).

To the above calculation for conveyor horsepower add—

For horsepower consumed by the terminals (head and foot shafts only)—

20 per cent for conveyors under 50-ft. centers;
10 per cent for conveyors under 100-ft. centers;
5 per cent for conveyors under 150-ft. centers.

For horsepower consumed by counter shaft drives—

10 per cent of total for each speed reduction through cast tooth gears;
5 per cent of total for each speed reduction through cut gears.

The result obtained from the horsepower formula gives the operating horsepower of the conveyor. It is not recommended to start a belt conveyor under load, but, where this is necessary, a motor of high starting torque, or slip ring type, should be used, or the size increased to take the additional starting load.

Belt Stress. From the horsepower obtained from the

TABLE I

Width of Belt	Value of "K" Plain Brgs.	Value of "K" Anti-Frict. Brgs.	H. P. For Tripper, "P" Plain Brgs.	H. P. For Tripper, "P" Anti-Frict. Brgs.
12	.149	.070	.75	.50
14	.144	.070	1.00	.75
16	.140	.070	1.00	.75
18	.135	.069	1.50	1.25
20	.132	.066	1.50	1.25
24	.125	.062	1.75	1.25
30	.117	.057	2.50	1.75
36	.109	.054	3.00	2.50
42	.102	.051	4.00	3.00
48	.097	.048	5.00	3.25
54	.092	.047	6.00	5.00
60	.090	.045	7.00	6.00

formula, the horsepower pull of the conveyor can be obtained:

$$\text{H.P. Pull} = \frac{\text{H.P.} \times 33000}{\text{Belt Speed}} = E$$

This horsepower pull is not the actual working pull in the belt, but is the effective pull "*E*." To this effective pull must be added the tension in the slack run of belt necessary to maintain driving contact between the belt and the conveyor drive pulley. The effective horsepower pull is therefore the difference between the working tension T^1, and the slack run tension T^2, or—

$$E = T^1 - T^2 = \text{H.P. Pull}$$

The ratio of the working tension T^1, to the slack tension, T^2, depends on the angle of contact of the belt on the pulley, and the co-efficient of friction between the belt and pulley, and is independent of the size of pulley. It is therefore apparent that lagging the pulley to increase the co-efficient of friction, and increasing the arc of contact of the belt on the pulley by snubbing, avoids the necessity for increasing the tension on both slack and working sides (T^2 and T^1) to secure increased horsepower pull. In other words, lagging and snubbing the conveyor drive pulley makes it possible to transmit more horsepower to a belt without increasing the internal belt stress. The ratio is constant, so that:

$$\frac{T^1}{T^1 - T^2} = \text{a constant "C"} = \frac{T^1}{E} \text{ (since } E = T^1 - T^2\text{)}$$

$$T^1 = CE$$

The foregoing formulas and tables were obtained from the Link-Belt Company, of Chicago.

TABLE II

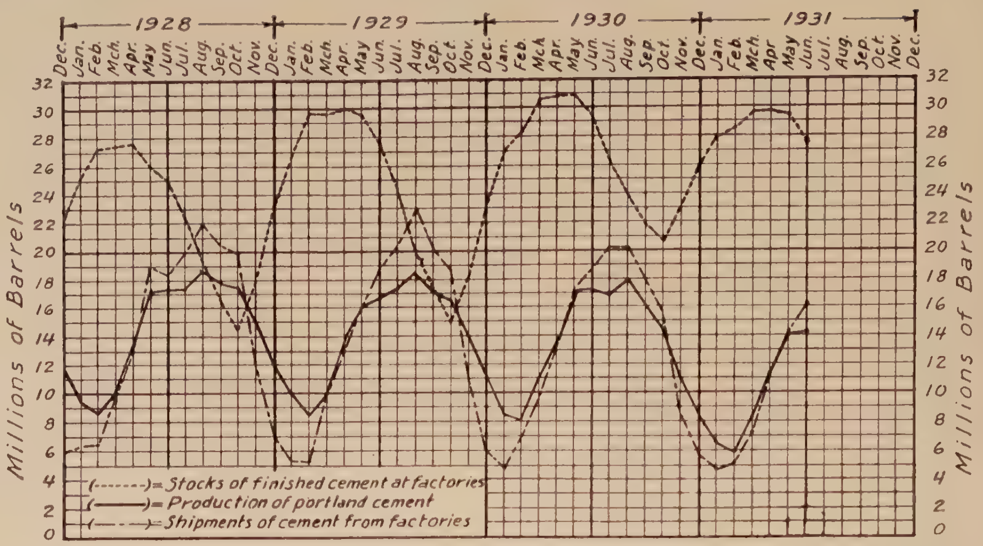
Approximate Weights of 28-Ounce Duck Rubber Conveyor Belt

Ply of Belt	Thickness of Top Cover Inches	Width of Belt, Inches 12	14	16	18	20	24	30	36	42	48	54	60
3	1/32	1.27	1.48	1.69									
3	1/16	1.51	1.76	2.01									
3	1/8	1.99	2.32	2.65									
3	3/16	2.46	2.88	3.28									
4	1/32	1.55	1.78	2.05	2.33	2.56	3.08						
4	1/16	1.78	2.08	2.37	2.67	2.96	3.56						
4	1/8	2.27	2.64	3.01	3.39	3.77	4.53						
4	3/16	2.75	3.19	3.64	4.09	4.54	5.46						
5	1/32			2.41	2.71	2.99	3.61	4.49					
5	1/16			2.71	3.05	3.41	4.07	5.09					
5	1/8			3.36	3.78	4.20	5.04	6.30					
5	3/16			4.00	4.50	5.00	6.00	7.50					
6	1/32					3.44	4.13	5.06	6.19	7.22	8.42		
6	1/16					3.84	4.61	5.76	6.92	8.06	9.4		
6	1/8					4.64	5.57	6.96	8.35	9.75	11.4		
6	3/16					5.44	6.54	8.16	9.80	11.42	13.35		
7	1/32							5.85	7.02	8.20	9.36	10.52	
7	1/16							6.46	7.75	9.04	10.32	11.60	
7	1/8							7.66	9.18	10.80	12.23	13.76	
7	3/16							8.86	10.62	12.38	14.15	15.92	
8	1/32								7.82	9.14	10.40	11.70	13.00
8	1/16								8.55	9.96	11.38	12.78	14.22
8	1/8								9.97	11.63	13.30	14.95	16.62
8	3/16								11.40	13.31	15.21	17.12	19.00
9	1/32									10.08	11.52	12.96	14.40
9	1/16									10.92	12.48	14.03	15.63
9	1/8									12.60	14.40	16.20	18.00
9	3/16									14.28	16.32	18.36	20.40
10	1/32										12.65	14.15	15.80
10	1/16										13.60	15.30	17.16
10	1/8										15.56	17.50	19.40
10	3/16										17.50	19.65	22.00

NOTE—The weight of 32-ounce duck rubber covered conveyor belting is 1/7th heavier than weights given in this table.

Cement Statistics for June

Production and Shipments Reach Seasonal High Mark for Year



Relation of Production to Capacity

(Figures represent per cent)

	The Month	The Twelve Months
June, 1931	65.4	55.2
June, 1930	**81.4**	**66.4**
May, 1931	62.8	56.5
April, 1931	52.1	57.7
March, 1931	36.9	58.6

	1930	1931	Increase or Decrease, %
Production, June	**17,239,000**	14,125,000	—18.1
Shipments, June	**18,781,000**	16,094,000	—14.3
Stocks at end of month	**29,364,000**	27,585,000	—6.1

	1930	1931	Increase or Decrease, %
Total production for year	**75,894,000**	60,140,000	—20.7
Total shipments for year	**70,138,000**	58,436,000	—16.6
No. of plants reporting	**166**	165	—.6

Production, Shipments, and Stocks of Finished Portland Cement, by Districts, in June, 1930 and 1931, and Stocks in May, 1931

District	Production—June 1930	Production—June 1931	Shipments—June 1930	Shipments—June 1931	Stocks at end of month 1930	Stocks at end of month 1931	Stocks at end of May, 1931*
Eastern Pa., N. J. and Md.	**3,397,000**	2,900,000	**3,903,000**	3,260,000	**6,513,000**	6,464,000	6,824,000
New York and Maine	**1,271,000**	1,230,000	**1,381,000**	1,360,000	1,737,000	**1,914,000**	2,044,000
Ohio, Western Pa. and W. Va.	**1,924,000**	1,505,000	**2,119,000**	1,507,000	**3,908,000**	3,511,000	3,513,000
Michigan	**1,487,000**	920,000	**1,459,000**	1,030,000	**2,812,000**	2,371,000	2,482,000
Wis., Ill., Ind. and Ky.	**2,336,000**	1,757,000	**2,552,000**	2,220,000	**4,591,000**	3,916,000	4,378,000
Va., Tenn., Ala., Ga., Fla. and La.	**1,316,000**	1,312,000	1,180,000	**1,463,000**	**2,001,000**	1,479,000	1,630,000
Eastern Mo., Ia., Minn. and S. Dak.	**1,987,000**	1,300,000	**2,412,000**	1,918,000	3,203,000	**3,244,000**	3,862,000
W. Mo., Nebr., Kans., Okla. and Ark.	**1,322,000**	1,187,000	**1,404,000**	1,303,000	**1,725,000**	1,710,000	1,826,000
Texas	558,000	**634,000**	**706,000**	693,000	**688,000**	675,000	734,000
Colo., Mont., Utah, Wyo. and Idaho	**300,000**	298,000	**296,000**	278,000	562,000	**629,000**	609,000
California	**955,000**	751,000	**951,000**	753,000	1,080,000	**1,101,000**	1,103,000
Oregon and Washington	**386,000**	331,000	**418,000**	309,000	544,000	**571,000**	549,000
	17,239,000	14,125,000	**18,781,000**	16,094,000	**29,364,000**	27,585,000	29,554,000

Production, Shipments, and Stocks of Finished Portland Cement, by Months, in 1930 and 1931

Month	Production 1930	Production 1931	Shipments 1930	Shipments 1931	Stocks at end of month 1930	Stocks at end of month 1931
January	**8,498,000**	6,595,000	**4,955,000**	4,692,000	27,081,000	**27,759,000**
February	**8,162,000**	5,920,000	**7,012,000**	5,074,000	28,249,000	**28,612,000**
March	**11,225,000**	8,245,000	**8,826,000**	7,192,000	**30,648,000**	29,676,000
April	**13,521,000**	11,245,000	**13,340,000**	11,184,000	**30,867,000**	*29,715,000
May	**17,249,000**	*14,010,000	**17,224,000**	*14,200,000	**30,891,000**	*29,554,000
June	**17,239,000**	14,125,000	**18,781,000**	16,094,000	**29,364,000**	27,585,000
July	17,078,000	......	20,153,000	......	26,289,000	......
August	17,821,000	......	20,299,000	......	23,824,000	......
September	16,124,000	......	18,083,000	......	21,889,000	......
October	14,410,000	......	15,599,000	......	20,697,000	......
November	11,098,000	......	8,784,000	......	23,056,000	......
December	8,480,000	......	5,688,000	......	25,883,000	......
	160,905,000	......	158,744,000	......	......	......

Blacker type indicates larger of two figures.
*Revised.

MEN and MILLS

Notes from the Field

O. L. Moore, Universal Atlas Testing Engineer, Elected to A. S. T. M. Executive Committee

O. L. Moore, engineer of tests for the Universal Atlas Cement Company at Chicago, was elected a member of the executive committee of the American Society for Testing Materials at its recent annual meeting.

Mr. Moore in 1916 was transferred from the laboratory of the Universal Portland Cement Company at Universal, Pa., to the Duluth plant of the company, where he was in charge of inspection and tests, and in 1917 he was transferred to the inspection department in the Chicago office, serving there in various capacities until 1926 when he assumed his present position.

Maginnis Elected Secretary-Treasurer of Keystone Cement

At a meeting of the board of directors of the Keystone Portland Cement Company, Philadelphia, July 17, Stuart P. Maginnis was elected secretary and treasurer, succeeding E. L. Clarke, resigned.

Muehlke Succeeds Atkins as International Director

At the annual meeting of the International Cement Corp., held in June, R. W. Atkins resigned as a director and was succeeded by H. H. Muehlke, secretary and treasurer of the company. Other retiring directors were re-elected.

Kempster Heads Community Chest Organization at East Chicago

J. H. Kempster, general superintendent of the Universal Atlas Cement Company plant at Buffington, Indiana, was elected president of the East Chicago Community Chest Association, at the annual meeting of the organization's officers and directors, on June 15.

He has been a director of the East Chicago Chamber of Commerce since its reorganization a number of years ago. He is also a director of the Community Chest Association and a member of its budget committee.

"Mr. Kempster is very well thought of in the community, and has the confidence of the people and of his business and professional associates to a very high degree," the local press stated upon his election.

Medusa Appoints Kanzig Manager in Chicago District

Charles S. Kanzig has been appointed district sales manager of the Chicago metropolitan territory by the Medusa Portland Cement Company, Chicago.

Mr. Kanzig had been associated with the Manitowoc Portland Cement Company, Manitowoc, Wis., from the time of its inception and when the latter became a unit of the Medusa company, he became a member of that organization.

Nazco Is Nazareth's New High-Early-Strength Product

The Nazareth Cement Company, Nazareth, Pa., early in July announced that it had begun the manufacture of "Nazco"—a specially prepared portland cement, containing no admixtures, and guaranteed to conform with all the requirements of the tentative specification of the A.S.T.M.

Former Superintendent for Peerless-Egyptian Dies Suddenly

Elmer C. Burns, 62, at one time superintendent of the Peerless-Egyptian Cement Company plant at Union City, Mich., and up to the time of his death employed there as a watchman, died suddenly on June 21.

Mill Equipment

Bailey Ratio Meter Serves as Guide to Combustion

A recent development of the Bailey Meter Company, Cleveland, Ohio, is the Bailey Ratio meter for use as a combustion guide in the firing of gas-fired kilns.

Its primary purpose is to provide operators with an easily understandable guide which will enable them to maintain a definite relation between the amounts of air and fuel supplied to the kiln so as to obtain high combustion efficiency. The meter contains two recording pens. One records the rate of oil flow and is actuated by a simple mechanical type of mechanism which receives its motive power from the differential pressure produced by an orifice in the fuel line. In similar manner, the shorter pen records the flow of air to the kiln. At the time the meter is being installed, a complete combustion test is run on the kiln to determine what ratio between air flow and fuel flow corresponds to best combustion conditions, and the air flow mechanism is then adjusted so that this ratio is always obtained when the two records coincide, one upon the other. The operator, therefore, merely has to keep the two pens together by proper manipulation of the air supply to be assured that maximum economy is being secured, the manufacturer states.

In addition to serving as a combustion guide, the Bailey Ratio meter is valuable as a fluid meter on the fuel line, it is stated. It records and indicates the rate of flow in any convenient terms, and the total flow may be given by the four-dial integrator which may or may not be installed in the meter as desired.

The Bailey Ratio meter has been so designed that it is possible to install auxiliary recorders of temperature or pressure when advantageous, to give records of these factors on the same chart with the flow records. This feature makes comparison of related factors a simple task, especially since the 12-inch diameter charts are uniformly graduated and are marked with direct reading scales. Each factor is recorded in an individual color so that it can be easily distinguished from other records.

Jones Herringbone-Maag Speed Reducers for Small Motor Drives

Two new double-reduction Herringbone-Maag speed reducers for small electric motor drives have just been announced by W. A. Jones Foundry & Machine Company of Chicago.

The smaller of the two machines (No. 90-D) is only 18¾ in. long and 12¾ in. wide, occupying but little more than one and a half square feet of floor space.

The other machine is only slightly larger, measuring 21¾ in. long and 14 in. wide.

In design, construction and manufacture, these small reducers are the same as the new improved models of larger capacity recently announced.

An extensive list of ratios is carried in stock to insure prompt deliveries.

Combustion Steam Generator Is New Unit

Combustion Engineering Corporation, New York City, is now offering the Combustion steam generator, a standard steam generating unit built in various sizes and providing a wide range of capacities at any desired conditions of steam temperature and pressure. Detail designs have been completed for eight sizes with capacities ranging from 70,000 to 400.000 lb. of steam per hour, from and at 212 deg. F.

This design is said to combine in one unit all the elements required for fuel-burning, steam generation and superheating, heat recovery and ash disposal. Pipes and headers essential for completing the circulating system of water walls are located entirely within the casing, where, in addition to performing their normal function as circulators, they also serve as highly effective heat absorbing surfaces, according to the manufacturer.

A point of particular interest is the entire absence of openings through the casing. Such openings are ordinarily required for the ingress and egress of wall tubes and headers. The Combustion steam generator casing is air-tight and dust-tight throughout, it is stated.

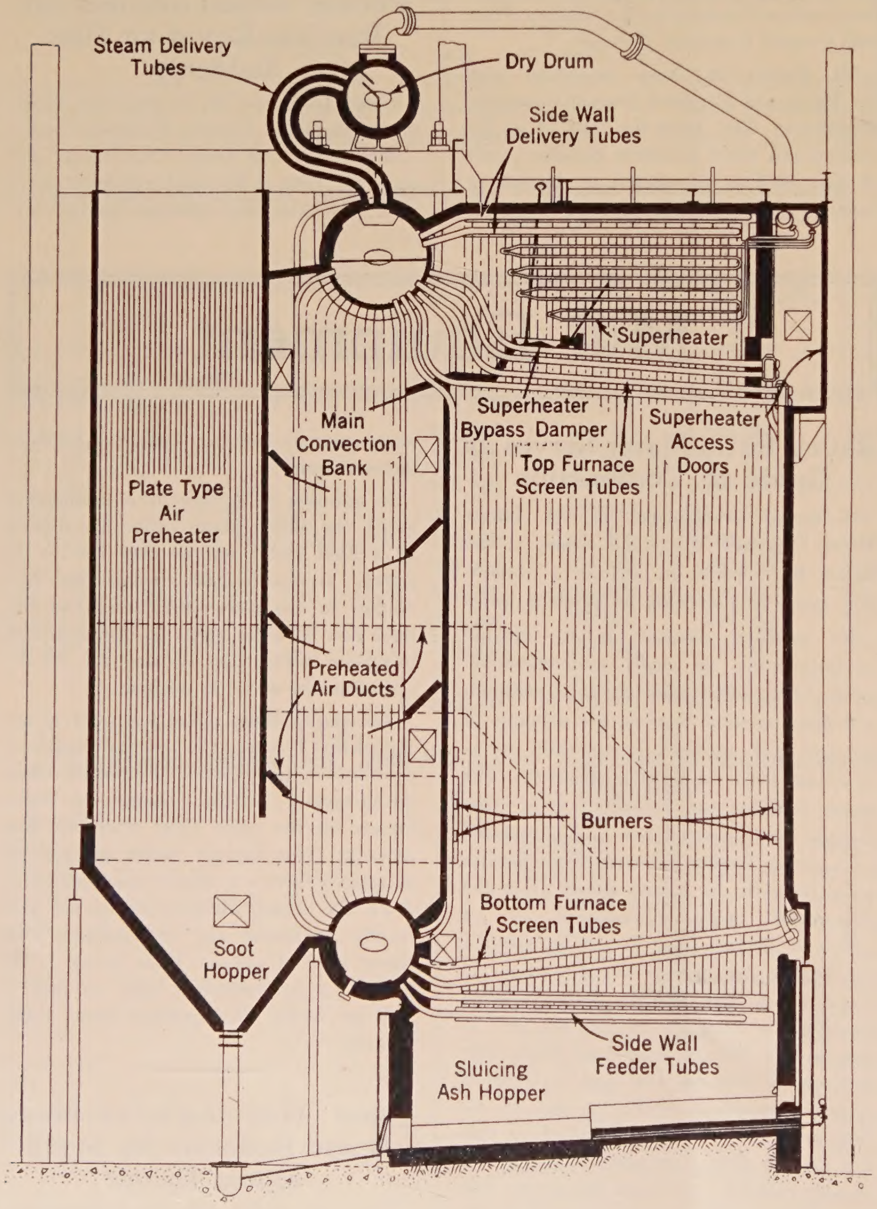
All four walls of the furnace are water-cooled, each wall being composed of a solid row of tubes with only sufficient space between them for construction requirements. The water-wall feeder and delivery tubes, at the bottom and top of the furnace, respectively, complete the heating surface of the furnace proper nearly all of which is exposed to radiant as well as convection heat.

The result of this arrangement of wall tubes and circulators is a furnace built completely of water tubes to the exclusion of exposed refractories and having the maximum attainable quantity of contained water with provision for the highest possible freedom of circulation.

This type of furnace is perfectly adapted to the type of firing used, i.e., the corner-tangential system which produces intense turbulence with extreme rapidity of combustion and correspondingly high temperatures, these high temperatures being the result (not the cause) of the high rates of combustion, it is claimed.

Another feature of interest is the superheater by-pass damper which affords a unique and much needed means of controlling superheat temperature. Adequate space is provided for the superheater which is so located in the assembly as to permit of simple supports and a degree of accessibility unusual in boiler construction.

The first unit of this new design to be installed in America has now been in operation for several months in the plant of a leading industrial company. In overall results and ease and dependableness of operation, its performance is said to have set an exceptionally high standard.



SECTIONAL SIDE ELEVATION OF COMBUSTION STEAM GENERATOR SHOWING PRINCIPAL PARTS AND ARRANGEMENT OF ELEMENTS

Industrial Literature

T-Z Reduction Crusher

The features of the *T-Z* reduction crusher are presented in brief in a folder distributed by the *Traylor Engineering and Manufacturing Company*, Allentown, Pa.

The T-Z, it is stated, is a breaker of greatest capacity at smaller than usual setting and may be built into any gyratory crusher.

Piping and Valve Bulletin

Semet-Solvay Piping and Valves, Bulletin 44, is a 48-page publication available on request from the *Semet-Solvay Engineering Corporation*, New York City.

Its contents include tables of standards, suggestions for efficient planning of new pipe, and diagrams of operating arrangements for gate valves.

About the Manufacturers of Equipment

Industrial Literature

New Book on Apron Feeders

A new book, No. 1351, has been published by *Link-Belt Company*, Chicago, on heavy-duty apron feeders, to supersede all previous literature on the subject.

A feature of the publication is the completeness of the tables and drawings, enabling the engineer to make complete preliminary layouts without consultation with the manufacturer.

This includes selection of the proper width of the apron, pitch of chain, sprocket sizes, size of head shaft required, etc.

The feeder, which is made of manganese steel, is suitable for handling either abrasive or non-abrasive material containing lumps of ¼-in. size, and smaller, up to 6-ft. dimensions—being especially well adapted to the handling of extremely heavy, large, lumpy and abrasive materials, according to the Link-Belt Co.

Selecting Correct Speed Reducer

Engineers and production men will be interested in the chapter on "Selecting the Correct Worm Gear Speed Reducer for the Job," that appears in the new *Worm Gear Speed Reducer Book* just issued by the *W. A. Jones Foundry & Machine Company*, Chicago, Ill. This chapter simplifies the selection of the right reducer and gives the list price of each machine. Other data of practical, up-to-date value on worm gear speed reducers, as well as photographs of interesting applications, are contained in this book. A copy will be sent upon request to the manufacturer.

Testing Equipment

Complete information on its cement testing machines and equipment and on metal testing machines is contained in sections on those subjects in a general catalog issued recently by the *Riehle Brothers Testing Machine Co.*, Philadelphia, Pa.

Among the equipment included are the cement briquette testing machine, immersion tank, moist closet, and steaming apparatus.

Amsco Cement Plant Equipment

Several installations of Amsco equipment and parts in cement plants are mentioned in the July issue of *The Amsco Bulletin*, published by the *American Manganese Steel Co.*, Chicago Heights, Ill.

Two items included are kiln feed pipes and burner tips.

New Bradley Pulverizer Booklet

A new pamphlet just issued by the *Bradley Pulverizer Company*, Allentown, Pa., describes concisely the entire line of products. Views of each of the 8 units, including griffin, roll, Hercules, and pneumatic mills and an air classifier, are shown.

Field Activities

Beardsley & Piper Enter Pulverized Fuel Equipment Field

The Beardsley & Piper Co., Chicago manufacturers of sand handling equipment, announce a new department for the engineering, development and marketing of pulverized fuel systems. Activities of this department will include every phase of pulverized fuel installation, from engineering to the completed and installed unit.

At the same time the Beardsley & Piper Company announce the acquisition of the services of *Aubrey J. Grindle*, pulverized fuel engineer, who has been placed in full, active charge of the newly organized department.

Mr. Grindle, a pioneer in the pulverized fuel industry, began experiments in this field in 1909. During many years of experimental work and persistent efforts to improve equipment and methods of using pulverized fuel, many successful installations are said to have resulted throughout the United States and Canada.

Williams Heads Union Chain Office

E. O. Williams, associated for the past sixteen years with the transmission and industrial chain trade in various sales capacities, and formerly manager of the Howe Chain Company, has been placed in charge of the Philadelphia office of the *Union Chain & Mfg. Co.*, Bourse Building, Philadelphia.

Westinghouse Official Dies

Truman P. Gaylord, 60, vice-president of the *Westinghouse Electric and Manufacturing Company*, East Pittsburgh, Pa., died suddenly on July 5 in Shelby, Michigan.

He was appointed district manager of the Westinghouse Company's Chicago office in 1902, the position he occupied until he was made acting vice-president in August, 1914. He was elected vice-president in April, 1929.

Manganese Steel Forge Representatives

In addition to established branch offices in New York, Pittsburgh, Detroit, Chicago and Los Angeles, the *Manganese Steel Forge Company*, Philadelphia, Pa., recently has appointed the following representatives: *J. G. Logan*, P. O. Box 506, Knoxville, Tenn., serving the states of Tennessee, North Carolina, South Carolina and Georgia; *S. L. Morrow Engineering Co.*, Brown-Marx Bldg., Birmingham, Ala., serving the state of Alabama, northern Mississippi and western Florida; *C. T. Patterson Co., Inc.*, 801 Tchoupitoulas St., New Orleans, La., serving the state of Louisiana and southern Mississippi, and *C. H. Collier*, 301 N. Market St., Dallas, Texas, serving the state of Texas.

These representatives are in a position to render engineering service and assistance in connection with standard and special applications of "Rol-Man" manganese-steel products, which include screens, liners, chutes, grizzly bars, chains, welding rods, and wear parts of various kinds.

Westinghouse Reorganizes Sales Department

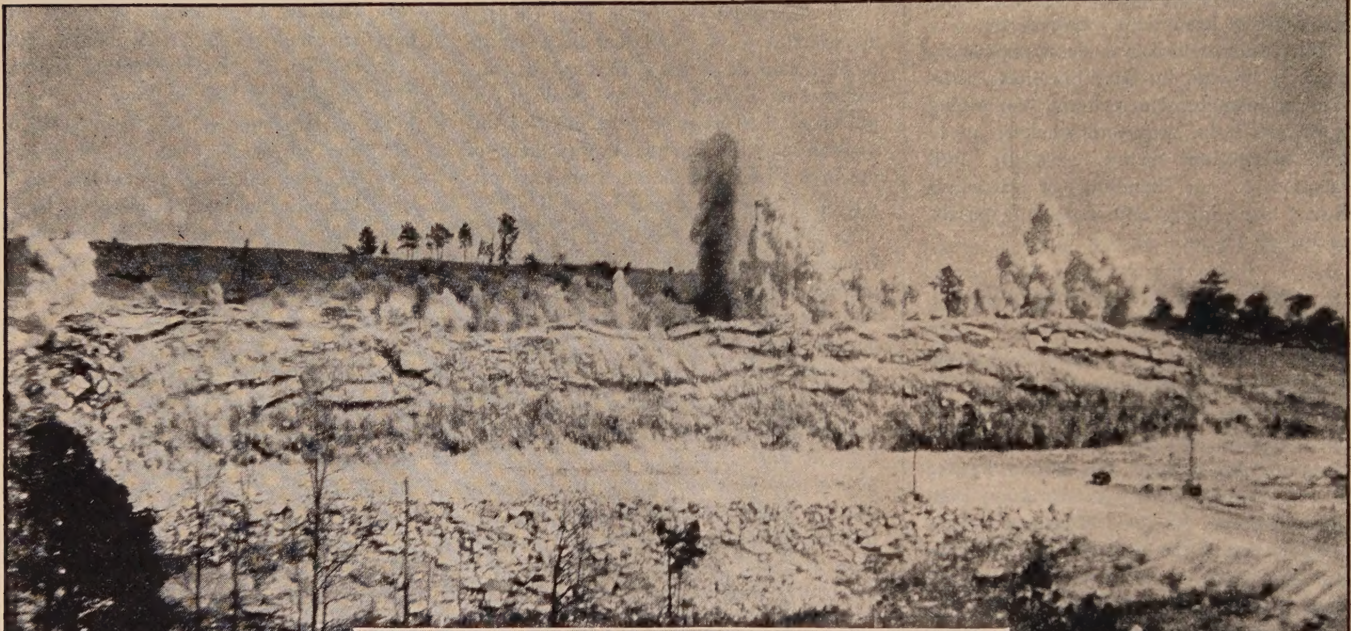
J. S. Tritle, vice-president and general manager, of the Westinghouse Electric and Manufacturing Company, in announcing the appointment of *T. J. Pace*, assistant to vice-president, in charge of general market planning, and research analysis; *M. B. Lambert*, sales manager in charge of transportation department; *O. F. Stroman*, sales manager in charge of industrial department; and *R. A. Neal*, sales manager in charge of central station department; stated that changed economic conditions required constructive realignment of all departments, so that the company could more effectively serve its customers and at the same time carry on more progressive development for the needs of all industries.

Link-Belt Division Elects Hoffman Vice-President

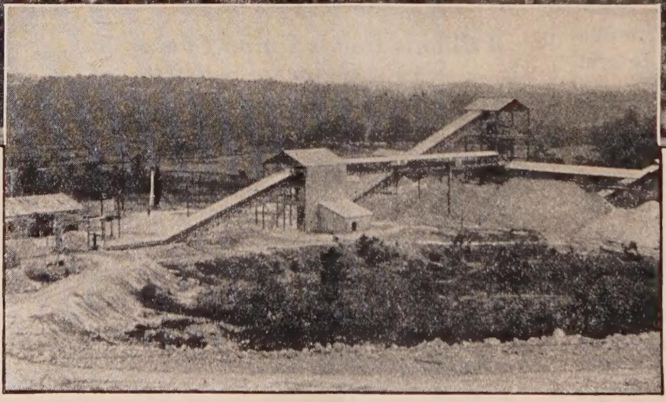
Ralph M. Hoffman, for 8 years manager of the Seattle office of the Pacific division of *Link-Belt Company*, has been appointed vice-president and sales manager of that division, with headquarters at San Francisco. He succeeds Harold H. Clark, who retired on June 1.

Twenty years of experience on the Pacific coast in selling elevating, conveying and power transmitting equipment well fits him for his new position.

Moving OF GRANITE



(Above) A view of the blasts on Rock Chapel Mountain



(Left) The Rock Chapel Plant of the Consolidated Quarries Corporation

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